Proceedings of the

American Association of Textile Chemists and Colorists

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November 17, 1958

37th National Convention———

PRESIDENT'S ADDRESS*

GEORGE O LINBERG

MR Chairman, distinguished guests, members of AATCC, ladies and gentlemen—

We meet this evening in the 37th year of our Association. This is the second time that I, as your president, have had the privilege of addressing you in assembled convention. Many of you were present in Boston last November, and I am glad to see so many of the same faces here in Chicago. Our Convention is the one time of the year that offers an opportunity to all in AATCC to meet again, renew old friendships and make new ones. But even more important, these Conventions give us both inspiration and information.

For many centuries, men have been meeting to exchange ideas. In fact, the convention business with its meetings and exhibits has been called the second oldest profession, dating back to ancient Tyre to records of great shows in 597 BC. St Paul, in the New Testament, tells of exhibits and gatherings in Greece. Things have come a long way and our host city, Chicago, is now the undisputed Convention capital of the world.

Last year 1,231 conventions were held here, attended by 1,149,000 people who spent 188 million dollars. That is 24 million dollars more than the total dollar sales of dyestuffs in the same year.

This, however, does not mean that the wet-processing industry as a whole is in the category of small business nor is our Association to be passed over lightly, for it ranks high on the list of an estimated 30,000 professional and trade organizations—in the size of its membership, in its financial standing and in its accomplishments in advancing the technology of textile chemicals.

As your chief executive officer, it is my pleasant duty to report to you the state of our affairs, and at the same time present to you a number of things I feel we should be thinking about.

This year, at the last official count, we achieved a new high of 6,880 individual members on our rolls. This exceeds last year's figure by 101. We have streamlined the procedure for processing membership applications, cutting down the elapsed time between receipt of an application and election to membership. Our Southern Sections, in particular, have led in the membership recruiting program and by their example I know that, with continued effort, we can reach the 10,000 member goal I established as a target when I took office a little less than two years ago. I hope that the momentum which has been gathering force in our Sections throughout the country will continue.

Our gain in individual memberships has been somewhat offset by a drop in Corporate Membership; yet considering the recession and its impact on our industry, we have held the line to a remarkable degree. Most of us remember the 1930's when we were urged to buy apples to bolster the economy. In 1957-1958 we were told to buy automobiles. On the same theory, we have continued to urge our industry to buy corporate memberships. While we have not come even close to our goal of $100,000, we managed to tread water with the rest of the country. I am told that this recession is officially over, and I hope it includes the textile industry.

Our financial position is sound. At the close of the fiscal year, July 31st, the Association put some $7,000 in the bank after paying all current expenses. This surplus resulted from the successful Convention in Boston last fall and will help restore our somewhat depleted convention reserve fund. During our fiscal year we operated well under the total budget established for the year. At the close of business on July 31, 1958, AATCC had total assets of $505,-507. Our budget for the current year 1958-1959 is $130,000, and if our estimates stand up we will again show an excess of receipts over expenditures for operations for the current year. We have made substantial curtailments, and I am hopeful that our income picture will permit us to do many things that need to be done as we move ahead in the future.

Our Council has moved about the country; in New York in January, Philadelphia in May, Charlotte in September and here in Chicago yesterday for its last meeting of the year. Next May it will meet in Montreal at the invitation of our good friends and neighbors, the Canadian Association of Textile Colourists and Chemists. Your national officers have also been traveling about in an effort to bring the national body into closer contact with the Sections. During my term of office, I have made official visits to our two Pacific Coast Sections, the three Sections in the New England Region, Piedmont, Delaware Valley and Metropolitan, Hudson-Mohawk, Washington, Mid-West, and in December I will meet with the Southeastern Section. I believe that every president should make at least one official appearance before each Section and I hope that those who follow me in office will make an effort to do so.

Our Sections are the life-blood of the Association and we need to do everything we can to assist and encourage them. Our Committee on Membership and Local Sections, under the Chairmanship of Weldon G Helmus, has issued a Guide for Section Officials to aid Section officers

*Presented during the Annual Banquet on October 31, 1958

in the administration of their duties. Our executive secretary, George Paine, has instituted a Section Letter from National Headquarters which contains helpful and timely information relating to Section activities as they concern the national body. I would like to see the chairmen of Sections and some of their officers meet once a year as a group during the Convention to discuss their problems. I feel sure they would benefit greatly in knowing how other Sections operate and how they handle their affairs.

We have under study a number of matters which are of interest to the membership of the Association, and I will touch on them briefly.

I am hopeful that our governing body will see fit to establish an Executive Committee of the Council. We have a Council of 56 members, and while we have 22 Council Committees concerned with various administrative aspects of the Association, I believe that an Executive Committee would give the Council more direct management control over the affairs of our organization.

In a committee headed by A Henry Gaede, we are studying the establishment of a Service Award to be presented at AATCC Conventions to a member who has been outstanding in his efforts to advance the objectives of AATCC. At present our only means of recognizing distinguished service is with the Olney Medal, and this covers scientific achievement. There are many who have made significant contributions to our Association to whom we are greatly indebted and to whom we should have some way of expressing our gratitude.

We are looking into the nominating and voting procedures for national office.

Our growth as an Association has resulted in many problems which are arising as we learn to adjust our thinking to our size. Our future also concerns us. Your Council has authorized the appointment of a special committee to study and possibly define our long-range objectives. In looking ahead and in paving the way for others to follow, we must be aware of the great changes constantly taking place in our industry and be prepared not only to keep in step but to lead. We must broaden our horizons and try to visualize where we will fit into the scheme of our economy and our technology ten or even twenty years from now. What we plan today will measure our usefulness as an Association tomorrow, and in the years to come.

I should like to note at this time that the publication of the four-volume *Colour Index* has been completed and that the four-volume set is now available. Our Colour Index Marketing Committee, first under the chairmanship of Albert E Sampson and now with Roland E Derby at the helm, has sold nearly 700 sets. The committee is about to embark on an intensive sales campaign and will need the help of every member to put this over. A lot of effective promotion and selling can be done by the Sections. For example, the Piedmont Section has purchased four sets which it will present to the public libraries in four major textile cities. Other Sections can render a great service to their communities by making the *Colour Index* available in this way.

The many members of the Society of Dyers and Colourists and of the AATCC and the many companies which cooperated are to be commended for their part in this monumental work. Both societies are considering the publication of supplements to keep the *Colour Index* up-to-date.

We owe a vote of thanks to our own William H Cady, who has acted as co-ordinator of the *Colour Index* and chairman of the Editing Committee. He has recently decided to retire from these activities and this month he has relinquished all AATCC responsibilities including the editorship of the *Technical Manual*. As many of you know, William D Appel, one of our past presidents, will take over his duties.

Another AATCC stalwart is dropping out of the picture, at least temporarily. Walter M Scott is going to Europe on an extended government assignment and Edward W Lawrence has assumed the chairmanship of the Publications Committee. We all wish Walter well in his new undertaking.

Earlier this year we were grieved to receive news that Alban Eavenson, sixth president of the Association, had passed away. He, like many others, has left an indelible mark on AATCC.

Our Archives Committee, under the Chairmanship of Sidney M Edelstein, is investigating the possibility of establishing an institute for the history of dyeing and finishing. Plans are under way to present this idea to the National Council for Textile Education for suggestions from the textile schools and colleges as to how this might be best accomplished.

I would report to you on the progress of AATCC research and technical activities were it not for the fact that tomorrow you will hear many experts cover this in the Research Symposium. Tomorrow you will see and hear AATCC in action, for research is essentially what AATCC is for. Everything else we do is in support of this basic purpose.

Under the guidance of Charles W Dorn, chairman of the Executive Committee on Research, Charles A Sylvester, chairman of the Technical Committee on Research, and the chairmen of the many research committees, our research program has made substantial contributions to the technology of our industry in the last year. Our committee framework, supported by National Headquarters personnel, is achieving increasingly good results. The executive secretary has written and published a Manual of Procedure for AATCC Research Committees. This is one of many steps which he has taken to strengthen the services of the National Headquarters to the Association's committees, its Sections and for the benefit of the Association as a whole.

It is my pleasure to announce that Leonard Smith of the National Cotton Council and a member of the Washington Section has been appointed chairman of the 1959 Convention. Our Convention next year will be sponsored by the Southern Region, which is comprised of the South Central, Southeastern, Piedmont and Washington Sections. It will be held in Washington, DC at the Sheraton-Park and Shoreham Hotels on October 8th through October 10th. Please take note.

I cannot close this talk without giving proper recognition to the outstanding work of our executive secretary, George P Paine. His tireless efforts day and night, including weekends, have made for a smooth-running organization and he has been of immeasurable help to me. We are indeed fortunate to have a man of his ability at National Headquarters.

I should like to express, on behalf of the entire Association, our appreciation to Elliott Morrill, chairman of this Chicago Convention Committee, and his hard-working team for organizing and putting on this splendid affair. To each of you who has worked so hard to make this Convention an outstanding success, we thank you. To those who have traveled many miles to come here and take part in these meetings, we thank you for your interest and your loyalty to our Association.

It has been a great honor to address you this evening.

1958 Intersectional Contest———

CARRIER-ASSISTED DYEING OF HYDROPHILIC FIBERS*

DELAWARE VALLEY SECTION

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The use of carriers as dyeing assistants, generally thought to be limited to the dyeing of hydrophobic fibers, has now been extended to include the hydrophilic fibers, cotton and wool. It is apparently generally applicable to all fibers.

The action of carriers on wool (and on fibers generally) is best explained by a mechanism involving the absorption of the carrier by the fiber. This absorbed carrier makes the fiber more permeable to the diffusion of dye, and therefore increases the dyeing rate. The most widely favored alternate mechanism, the solvent layer theory, is shown to be untenable on theoretical grounds. This conclusion is verified experimentally.

The importance of this generalized view of carrier dyeing is indicated and some potentially useful applications of this phenomenon are suggested.

INTRODUCTION

DYEING assistants, called carriers, are required in dyeing a number of synthetic fibers, particularly Dacron polyester fiber, to increase the rate of dyeing. Although this term has not been used in connection with the dyeing of hydrophilic fibers, there is reason to believe the principle of carrier dyeing is applicable to these fibers. We define a carrier as an agent other than electrolyte which increases the rate of dyeing without causing an appreciable permanent physical or chemical change in the fiber. Recent work on the use of solvents as assistants in the dyeing of wool from aqueous baths appears to be an example of the applicability of the principle of carrier dyeing to a hydrophilic fiber.

It was our intent in undertaking this study to show that the principle of carrier dyeing is universal and can be applied to the hydrophilic fibers. We also sought to elucidate the mechanism of the solvent-assisted dyeing of wool, to show its relationship to carrier action on other fibers and to indicate some potential practical applications of this phenomenon.

BACKGROUND

The current interest in the solvent-assisted dyeing of wool with acid dyes stems from the work of Stevens and Peters *(1, 2)*. They observed that, in aqueous dyebaths containing sparingly soluble amines, alcohols, or phenols, the rate of dyeing with acid dyes (particularly the neutral-dyeing 2:1 dye:metal complex dyes) was much more rapid than in the absence of these agents. For example, 4.0 percent Acid Black 58 was exhausted almost completely in 30 minutes at 60°C from a bath containing 7.0 percent *n*-butanol. Other solvents found to be effective were thymol, carvacrol, tert-butyl cresols and geraniol.

Stevens and Peters suggest the following explanation for the increased rate of dyeing:

"When absorbed, the solvent in the fibre forms a separate phase from the rest of the dyebath—a sort of minute solvent dyebath within the fibre. If the particular dye or pigment is soluble in such a solvent, the rate of diffusion of the colour into the absorbed solvent will be rapid, and the rate of diffusion of the dye from it into the fibre may be so high that the total rate of dyeing can be markedly accelerated. Because the usual barrier to diffusion has thus been circumvented, dye absorption proceeds at a much higher rate, and satisfactory dyeings can be obtained at fairly low temperatures."

Alexander and Stacey *(3)* suggest that the solvents may effect high dyeing rates by breaking down the dye aggregates. In addition, they raise the question of "whether these substances affect also the properties of the fibers and thus assist penetration."

Lindberg *(4)* has shown that in wool dyeing the limiting factor in the dyeing rate is the low permeability of the surface layer of the cuticle. In order to increase the rate of dyeing of wool, it is necessary to make this cuticle layer more permeable to the penetration of dyes. Treatment of wool with alcoholic potassium hydroxide achieves this end. Kärrholm and Lindberg *(5)* found that when a sample of wool was treated with sodium hydroxide under conditions which would make the cuticle permeable to dyes, and subsequently dyed, the rate of dye uptake was markedly increased. Addition of butanol to the dyebath gave only a small additional increase in dyeing rate. This suggests that butanol may also make the wool surface more permeable so that the dyes can penetrate more readily.

Kärrholm and Lindberg suggest the similarity of the process in question to that of carrier dyeing of synthetic fibers. They refer to Kramer *(6)* who proposes, according to Kärrholm and Lindberg, that "the carrier is adsorbed on the fiber surface, and in this layer the dye concentration is higher than in the bath, thus giving rise to a higher concentration gradient, causing a higher diffusion rate in the fiber. The dye is also consider-

* Presented by D P Hallada on October 31st at the Conrad Hilton Hotel during the 37th Annual Convention.

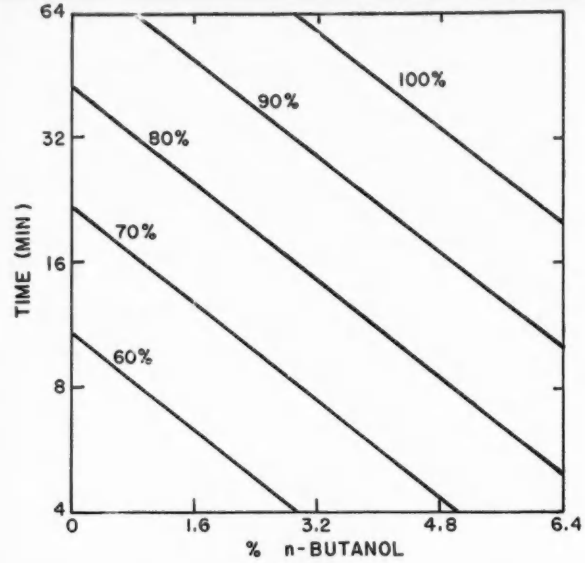

Figure 1
Effect of butanol conc and time on the degree of exhaustion of Acid Black 58
pH=5 Temp=152.5°F

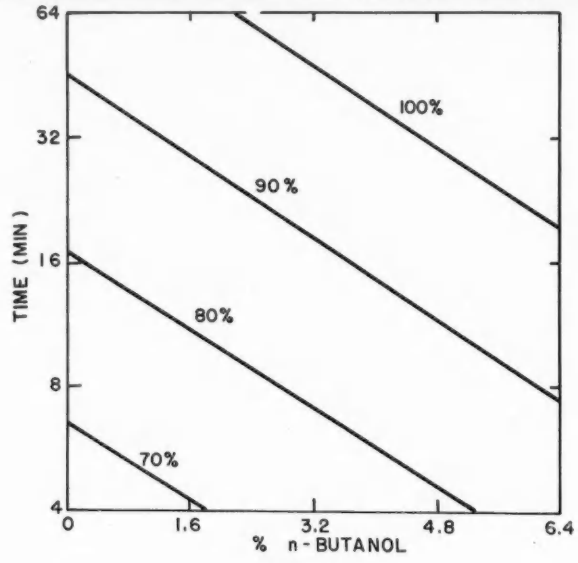

Figure 2
Effect of butanol conc and time on the degree of exhaustion of Acid Black 58
pH=5 Temp=170°F

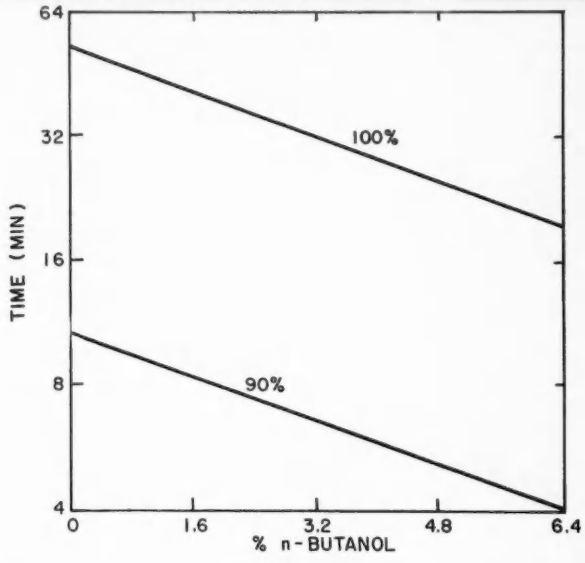

Figure 3
Effect of butanol conc and time on the degree of exhaustion of Acid Black 58
pH=5 Temp=187.5°F

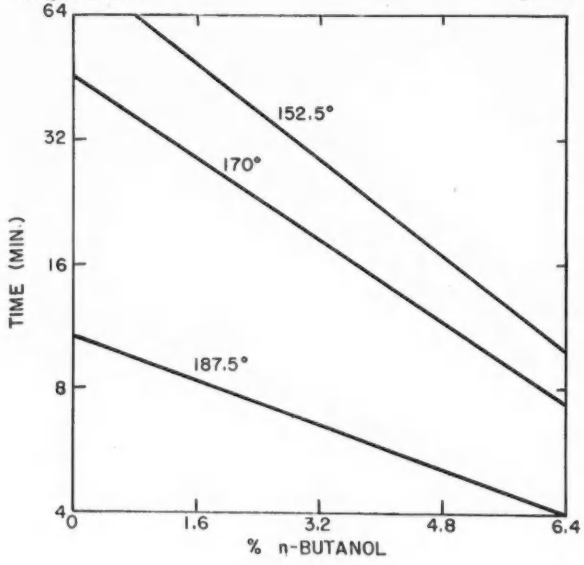

Figure 4
Effect of *n*-butanol conc and time on the exhaustion of Acid Black 58 at three temperatures

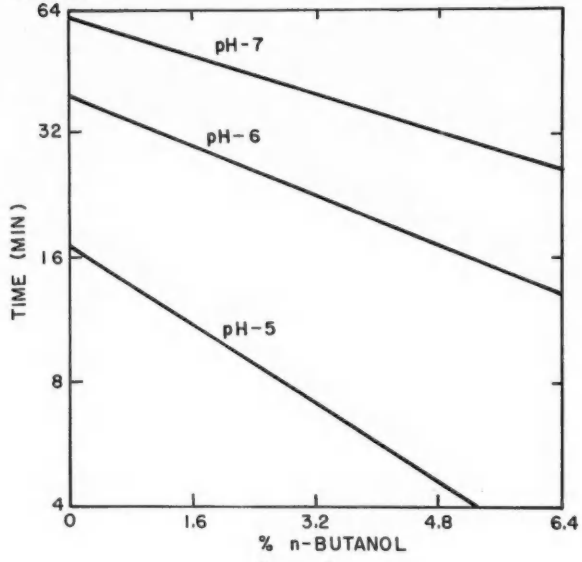

Figure 5
Effect of *n*-butanol conc and time on the exhaustion of Acid Black 58 at three pH's

ed to be disaggregated in the carrier layer. Another effect of the carrier is an opening of interior bonds, eg, hydrogen bonds, thus facilitating the penetration of the dye." The first part of this theory is similar to that advanced by Choquette *(7)* who suggests that in the dyeing of Dacron polyester fiber chlorobenzene promotes faster dyeing by producing a layer of concentrated dye solution around the fiber, thereby promoting absorption and penetration. This mechanism has also been proposed by Vickerstaff *(8)* and Fortess *(9)*. Schuler *(10)*, on the other hand, reported that, in dyeing Dacron, the carrier functions by loosening the interchain forces in the fiber, permitting more rapid diffusion of the dye through the somewhat more permeable fiber.

There appears to be considerable overlapping of the theories for the action of carriers in dyeing Dacron and the effect of solvents in dyeing wool. This suggests that the mechanisms may be related and that one mechanism may explain both reactions.

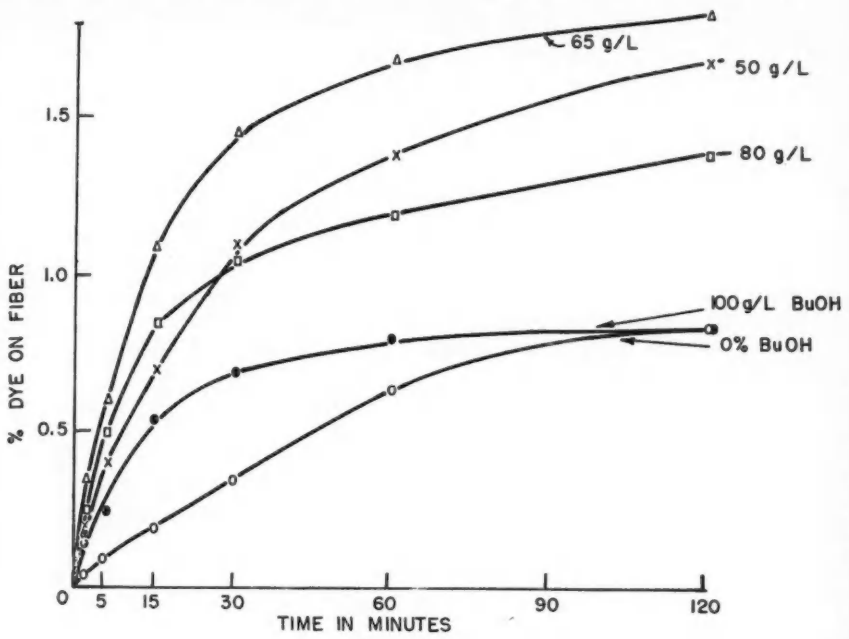

Figure 6
Effect of butanol conc on rate of dyeing Acid Black 58 on wool

EXPERIMENTAL

FACTORS AFFECTING THE EXHAUSTION OF DYES ON WOOL ——For a given dye and a given solvent, time, temperature, pH and concentration of solvent are the most important variables in dyeing wool. The effects of these variables have been investigated using the system of Peters and Stevens (*1, 2*) (Acid Black 58 and *n*-butanol). The experiments were carried out according to a statistical design. (For details see Appendix.) The wool skeins were conditioned by refluxing in a bath adjusted to the pH at which the tests were to be run and then dried. The skeins were entered into the preheated dyebath containing *n*-butanol, dye and glycolic acid or sodium carbonate to adjust the pH. Samples of the bath were removed at predetermined times and the dye remaining in the bath determined spectrophotometrically. A statistical analysis of the results produced the relationships shown in Figures 1 to 5.

The value of *n*-butanol in reducing the time required to get a high degree of exhaustion at low temperatures can be seen in Figures 1, 2 and 3. With no butanol, 60 percent exhaustion is obtained in about 10 minutes while with 6.4 percent butanol about 90 percent exhaustion would be obtained in the same time. As the temperature is increased, the effect of the butanol decreases, as indicated by the change in the slope of the curves. This is better shown in Figure 4, where the 90 percent exhaustion contours are shown. Not only is less time required to get 90 percent exhaustion at the higher temperature, but the effect produced by the butanol is reduced as the temperature increases. Similarly, as the pH of the dyebath is increased from 5 to 7, the effect of the butanol decreases. This effect is shown in Figure 5, a composite of the 80 percent exhaustion contours.

In the above experiments, the concentration of *n*-butanol was always less than that required to saturate the aqueous phase; therefore, no solvent layer could exist. Dyeings were made in the Kinetodyeograph (*10*) over a range of butanol concentration from 0 to 100 percent. These dyeings were made in a 40:1 bath with the pH adjusted to 5.0 at the beginning of the dyeing process. Small samples of the wool were taken at intervals and the amount of dye on the wool was estimated by comparing these samples with standard dyeings. The results of these experiments are summarized in Table I, and shown graphically in Figure 6.

The maximum effect occurs at about 65 grams per liter of butanol. This is the saturation limit of butanol in water at the dyeing temperatures. As the amount of butanol is increased beyond the saturation value, the rate of dyeing is decreased below that obtained at the optimum. The equilibrium value is also decreased.

Cross-sections of the dyeings made

TABLE I
EFFECT OF BUTANOL CONCENTRATION ON EXHAUSTION OF ACID BLACK 58
Visual estimate of strength versus exhausted boil dyeing rated 100

Time, minutes	Butanol conc, g/l 0	50	65	80	100	730	810*
2	2.5	10	17.5	12.5	7.5	0	0
5	5.0	20	30.0	25.0	12.5	0	0
15	10.0	35	55.0	42.5	27.5	0	0
30	17.5	55	72.5	52.5	35.0	0	0
60	32.5	70	85.0	60.0	40.0	0	0
120	42.5	85	92.5	70.0	42.5	0.5	0

Conditions: 2.0% Acid Black 58
Temperature: 160°F
pH 5

*100% Butanol

Figure 4
Effect of *n*-butanol conc and time on the exhaustion of Acid Black 58 at three temperatures

Figure 5
Effect of *n*-butanol conc and time on the exhaustion of Acid Black 58 at three pH's

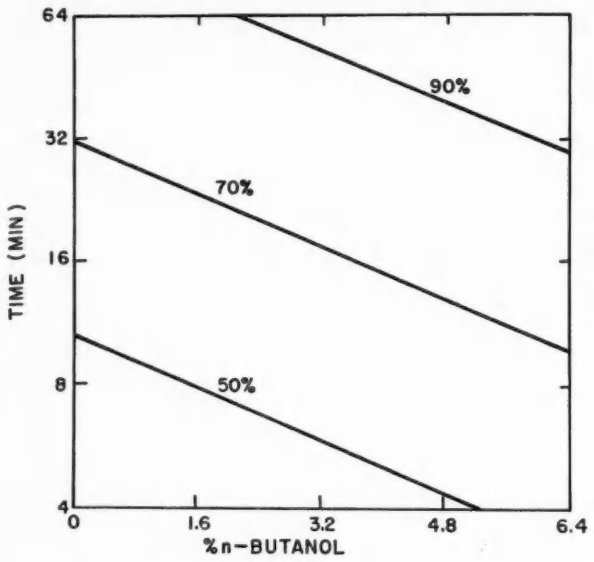

Figure 7
Effect of conc and time on the degree of exhaustion of Acid Red 85
pH=5 Temp=170°F

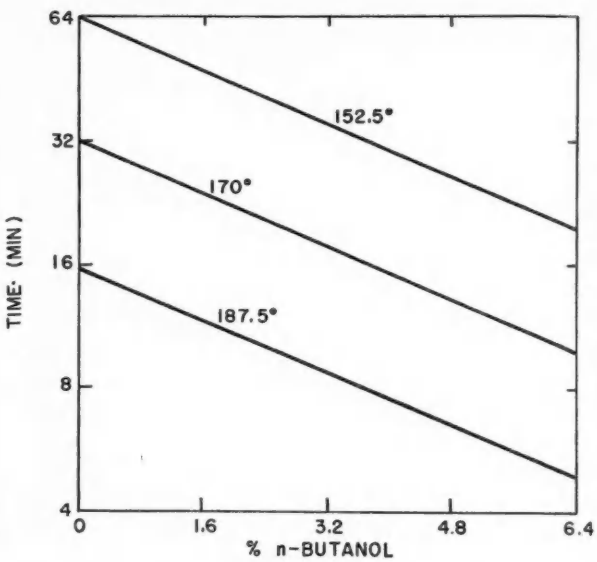

Figure 8
Effect of butanol conc and time on exhaustion of Acid Red 85 at various temperatures
pH=5 70% exhaustion

with 65 grams per liter butanol in 15 minutes were essentially completely penetrated, while the dyeing made without a carrier for 120 minutes was only ring dyed. This increased penetration at low temperature is a real advantage for carrier dyeing.

TESTING OF COMPOUNDS AS CARRIERS——Stevens and Peters report that a large number of solvents have been tested and that sparingly soluble amines, alcohols and phenols were found effective as carriers for the 2:1 dye:metal complex dyes on wool. Our high-spot tests of a large number of agents are summarized in Table II. All judgments of carrier activity were based on apparent strength of the rinsed dyeings versus a control dyeing with no carrier present. Where the solubility was exceeded, the ratings may be influenced by the residual oil. Further testing of these agents at lower concentrations is therefore necessary.

RESPONSE OF DYES TO CARRIERS——

A) *Conventional Dyes on Wool.* Much of our work was with Acid Black 58, a 2:1 dye:metal complex, but other classes of dyes were also tested with a few carriers. Stevens and Peters (*1*) report that ". . . the effect of adding solvents to the dyebath is much more marked with the neutral-dyeing 2:1 metal complex dyes than with any other type so far examined, although a slight increase in the rate of absorption was observed with Polar Red G . . ." (Acid Red 85, *CI* 22245). The designed experiment and statistical analysis previously described was repeated using Acid Red 85 (nonmetalized milling dye) with the following results:

Butanol has a significant effect on the rate of exhaustion of Acid Red 85 but its effect is somewhat less than on Acid Black 58 under the same conditions. This can be seen by comparing the slopes of the curves in Figures 2 and 7. The effect of the butanol on Acid Red 85 appears to be independent of the temperature and pH over the ranges tested. This is shown by the curves in Figures 8 and 9 where the slopes are constant in spite of changing temperatures and pH's. In contrast, the effect of butanol with Acid Black 58 is influenced by both pH and temperature.

Other premetalized neutral-dyeing colors tested, Acid Orange 86, Acid Brown 45, and Acid Violet 75, all responded to the addition of butanol, benzyl alcohol or phenol to the dyebath. Although these dyes varied somewhat in the degree of response, they were generally affected to a greater degree than the acid-dyeing types.

The milling types, such as Acid Yellow 38 (*CI* 25135), Acid Red 174 (*CI* 24810), and Acid Blue 80 (*CI* 61585) showed little response with butanol and benzyl alcohol but looked more promising when phenol was used as the carrier. The premetalized acid-dyeing types showed little or no response when tested at pH 5 to 6. All tests were made at 160°F for 15 minutes using 75 grams per liter of carrier. Other conditions may produce greater effects.

TABLE II
COMPOUNDS TESTED AS CARRIERS
Listed in decreasing order of effectiveness

Compounds showing a marked carrier effect	*Compounds showing a moderate carrier effect*
*Benzyl alcohol	*α-Terpineol
Phenol	*Mixed m- and p-cresol
*Carvacrol	Pyridine
*Thymol	Ethyl lactate
*Cyclohexanol	*Amyl acetate
*Pine oil	Morpholine
n-Butyl alcohol	*Ethylene glycol diacetate
Ethylene glycol	
Ethylene glycol monobutyl ether	
*Ethyl butyl ketone	
*2-Ethyl hexyl alcohol	
Compounds showing little or no carrier effect	*Compounds showing a reserving action*
Triethylene tetramine	*Dichlorobutane
N,N-dimethylformamide	Ethyleneglycol monomethyl ether
*n-Hexanol	Methanol
Ethyl alcohol	N-Ethylmorpholine
Acetone	β-ethoxyethyl acetate
Ethylene glycol monoethyl ether	*Dichloroethyl ether
Thiodiethylene glycol	Polyethylene glycol No. 200
Urea	*2-Methoxybutanol
Ethylethanolamine	
2-Methyl-2,4-pentanediol	

Conditions: 1.0% Acid Black 58
15 minutes at 160°F
pH 5 to 6
75 g/l Compound
40:1 Bath-to-fiber ratio

*The solubility for these compounds was exceeded.

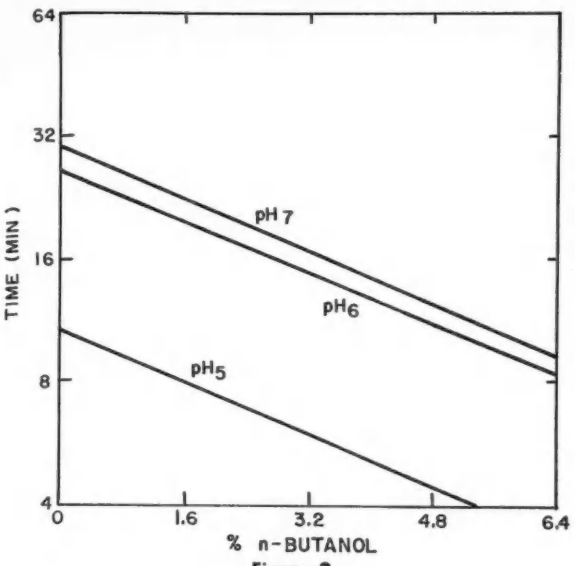

Figure 9
Effect of butanol conc and time on exhaustion of Acid Red 85 at three pH's
50% exhaustion Temp=170°F

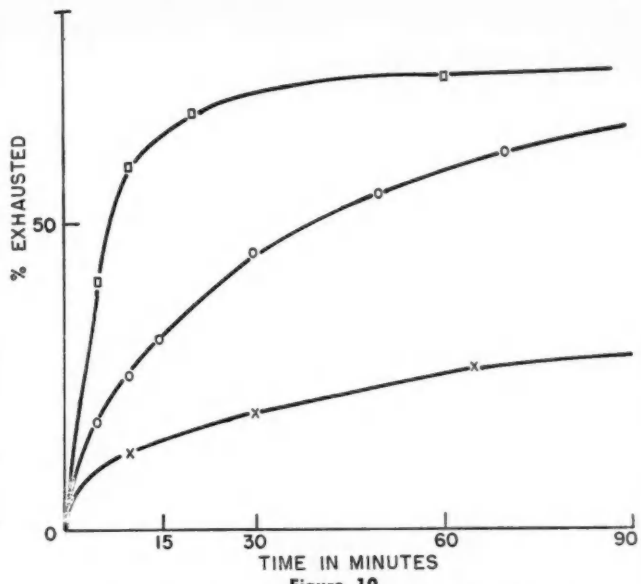

Figure 10
Effect of urea on exhaustion of 0.15% Direct Green 6 on cotton—no salt
40-1 bath Temp=176°F
X—control O—10 g/l urea □—50 g/l urea

B) *Unconventional Colorants on Wool.* Stevens and Peters (*2*) reported that some pigment types can be applied to wool by the use of butanol. In Table III, we have summarized the effect of carriers on the application of three such materials to wool.

The control was an aqueous dyeing made for one hour at the boil. The small amount of color on the control appears to be due almost entirely to surface deposition of the pigment. As is indicated above, the dyeings made with a carrier are much stronger and are apparently dyed.

Two solvent dyes were applied to wool at 160°F. Solvent Yellow 29 (*CI* 21230) and Solvent Red 26 (*CI* 26120) exhausted rapidly with benzyl alcohol, *n*-hexanol or pine oil. However, the dyeings were very unlevel because the carriers were not completely dissolved. These should be tried under more favorable conditions. Phenol, which was completely soluble under these conditions, gave a good clear dyeing.

TABLE III
EFFECT OF CARRIERS ON THE EXHAUSTION OF PREMETALIZED PIGMENTS ON WOOL
Visual estimate of strength vs aqueous boil dyeing rated 100

	Carriers		
Dyes	*None*	*n-Butanol*	*Phenol*
Irgacet Orange RL	30	120	120
Irgacet Yellow 2RL	20	30	75
Irgacet Scarlet RL	10	120	300

Conditions: 160°F—15 minutes
1.0% Dye
75 g/l carrier
40:1 Bath-to-fiber ratio

The application of these or other unconventional colorants to wool has a great potential, and may lead to practical methods for obtaining shades and fastness not now obtainable.

THE EFFECT OF CARRIERS IN DYEING CELLULOSIC FIBERS ——Carrier action in dyeing cellulosic fibers is less thoroughly explored but at least one substance, urea, acts as a carrier on cotton. The rate of dyeing with Direct Green 6 (*CI* 30295) from a bath containing no added salt at 175°F is significantly increased by the addition of urea. This is shown in Figure 10.

Direct Blue 2 (*CI* 22590) shows less response with urea than does Direct Green 6. This probably is to be expected, since Direct Green 6 is a disulfonate while Direct Blue 2 is a trisulfonate. When salt is added to the bath, the effect of the urea is overshadowed, as shown in Figure 11.

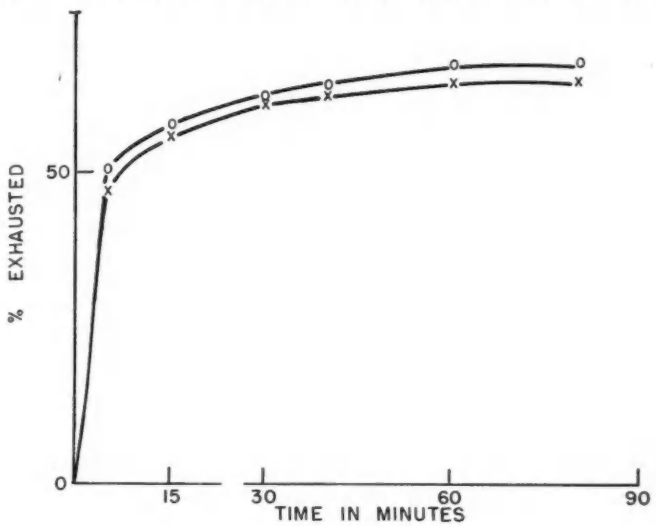

Figure 11
Effect of urea on exhaustion of 1% Direct Blue 2 on cotton—low salt conc
3.0% salt Temp=160°F 40-1 bath
X—control 0—50 g/l urea

Melnikov and Moryganov *(11)* report that pyridine increases the rate of diffusion of direct dyes in cellulose, but in our tests the rate of dyeing and the equilibrium exhaustion value were found to be decreased when seven to 50 grams per liter of pyridine was added to the dyebath. The four dyes tested, Direct Blue 2, Direct Blue 104, Direct Green 6 and Direct Brown 111, all showed this effect.

The addition of pyridine to the bath lowers the thermodynamic activity of the dye to such an extent that the equilibrium value for the dye on the fiber is significantly reduced. This is a larger effect than the change in rate of diffusion which supposedly occurs at the same time. This effect of pyridine additions to the dyebath in dyeing Direct Blue 2 is shown in Figure 12.

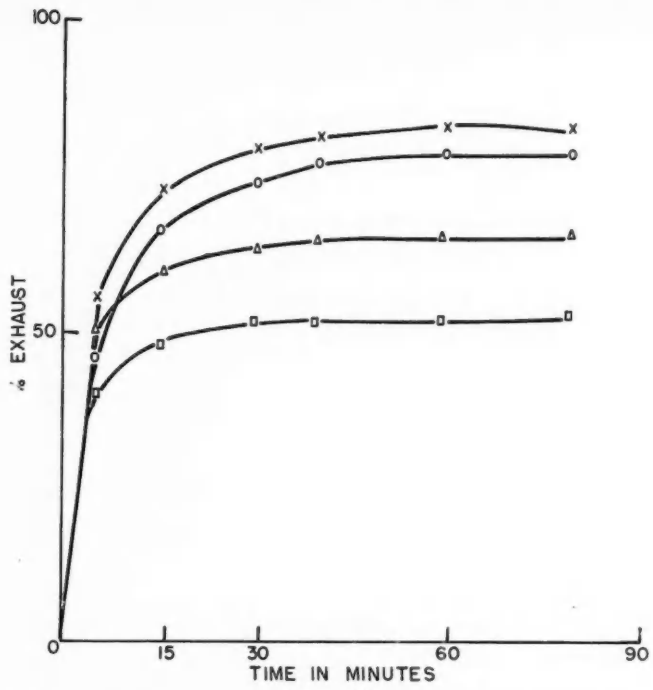

Figure 12
Effect of pyridine on exhaustion of 1% Direct Blue 2 on cotton
10.5% salt Temp=160°F 40-1 bath
X—control 0—7.5 g/l pyridine △—25 g/l pyridine □—50 g/l pyridine

DISCUSSION

THE MECHANISM OF THE CARRIER ACTION OF *N*-BUTANOL ON WOOL——In the background section of this paper, data are reviewed on the carrier action in dyeing hydrophobic fibers, such as Dacron polyester fiber, and a similar phenomenon encountered on wool. It appears that these effects are part of a larger pattern and that the general principle of carrier action probably applies to all fibers. The various mechanisms proposed for Dacron are equally applicable to the other fibers subject to the condition that the carrier be chosen to fit the physical and chemical properties of the fiber, dyebath and dye.

Three major mechanisms are proposed in the literature for the mode of action of carriers. These are stated simply below:

1) *Effect on the Dye in the Dyebath.* The carrier in solution in the dyebath changes the form or degree of aggregation or solubility of the dye, and thereby changes the dyeing rate.

2) *Effect of the Solvent Layer.* For materials having limited water solubility, a layer of solvent or carrier forms on the fiber surface. The dye has a high solubility in this surface layer and, thus, dye is concentrated at the surface of the fiber.

3) *Effect on the Fiber.* The carrier is absorbed by the fiber and changes the properties of the fiber, thereby making the passage of the dye molecules through the fiber more rapid.

Only the third mechanism can account for all the available data. It is difficult to prove this is the correct mode of action, but we believe we can strengthen the arguments for the carrier acting on the fiber by a process of elimination. The effect observed is not necessarily simple. With some dyes, carriers or fibers, a combination of mechanisms may be involved, but the major effect on wool with *n*-butanol and Acid Black 58 (and generally for all fibers, carriers and dyes) is that of the carrier on the fiber itself.

Some of the evidence against the general acceptance of the first two mechanisms is presented here.

The Effect on the Dye in the Dyebath. The effect of a solvent, such as *n*-butanol, on a dye is believed to be minor. Incorporation of *n*-butanol into a dyebath up to saturation produced little or no change in the absorption spectrum of Acid Black 58, ie, the dye obeyed Beer's Law with or without the butanol present. Associated dye would be expected to deviate from Beer's Law. Highly water-soluble solvents, such as ethanol and acetone, which would be expected to decrease the aggregation of the dye (if it is aggregated) *do not* increase the rate of dyeing significantly.

The Solvent Layer Theory. The solvent layer theory is untenable on several grounds.

a) We have shown that the maximum effect with *n*-butanol and Acid Black 58 is attained at or just below the saturation limit of the butanol in the dyebath where no layer greater than monomolecular can reasonably be expected to exist. The introduction of solvent beyond the amount necessary to saturate the dyebath may lead to the formation of a sizable layer, but when such large amounts of solvent are added, the rate of dyeing and the equilibrium value are decreased.

b) If a surface layer should exist, it would be expected to decrease rather than increase the rate of dyeing and the equilibrium value of the dye absorbed. If it is assumed that the rate-limiting step is the diffusion of the dye away from the surface of the fiber toward the center and that the surface of the fiber is essentially in equilibrium with the bath surrounding it *(12)*, the rate of dyeing will be related to the activity (not concentration) of the dye in the liquid phase in contact with the solid fiber surface. When a solvent layer is present in which the dye is much more

soluble, the activity of the dye in the solvent layer must be much reduced, since it is now in equilibrium with an aqueous phase having a much-reduced dye concentration. The fiber surface is essentially in equilibrium with the solvent layer, and, thus, its activity must also be lower. It, therefore, follows that the rate of dyeing must be lower and that any solvent layer which forms a more concentrated dye layer must show a substantially *decreased* dyeing rate.

In support of these theoretical considerations we have found that a butanol dyebath saturated with water is almost completely ineffective, even when massive amounts of dye (up to 80%) are used. Such a bath would approximate the composition of the layer suggested by this theory. Rather than being a suitable dyeing medium, butanol saturated with water is effective in stripping dye.

In summary, all the data collected on dyeing various fibers with the use of dyeing accelerators or carriers falls into a single consistent pattern. The only requisite is that the carrier be chosen to fit the physical and chemical nature of the fiber and dyebath. The overwhelming mass of evidence indicates that this effect takes place by action of the carrier on the fiber.

PRACTICAL APPLICATIONS OF CARRIER - ASSISTED DYEING PROCESSES——In the field of printing, a number of practical applications of the use of carriers on hydrophilic fibers have appeared in the literature, but were not recognized as such. Delmenico *(13)* has very carefully examined the use of solvents in the vigoureux printing of of wool. He found benzyl alcohol to be especially effective in increasing the color yield and accelerating the fixation process. Saville *(14)* pointed out the advantages of the use of solvents to shorten the aging time in printing viscose, rayon, silk and wool. By using urea, thiourea, ethylene glycol or thioethylene glycol either alone or in combinations it was possible to use continuous processes where batch development methods are required in the absence of the solvents. These and similar examples of the use of additives to shorten fixation time and increase color yield in printing hydrophilic fibers have always been regarded as isolated cases. As we have shown, this phenomenon is generally applicable. With the knowledge that this general tool is available to him, the practical printer may find many circumstances where the advantages of faster, more complete fixation offset the added cost of a carrier.

Until now, practical use of carriers in dyeing processes has been confined to the hydrophobic fibers, such as Dacron polyester fiber, where such materials are required for practical dyeing at the boil. Most of the currently known carriers for hydrophilic fibers must be used in relatively high concentrations. Their use would appear more practical in low-volume continuous dyeing processes or where their use produces an effect not otherwise obtainable. There is some evidence to indicate that dyes not applicable by conventional means can be dyed by the use of a carrier. Some of these unconventional dyes might be expected to give outstanding fastness. Since high-quality, well-penetrated dyeings can be obtained at relatively low temperatures, it should be possible to dye wool and wool-like fibers with the very minimum of damage to the fibers.

The carrier dyeing of hydrophilic fibers, such as cotton and wool, is an interesting extension of a principle formerly thought restricted to other fibers. This general method of dyeing offers a new tool for the practical dyer. This method may not be economically practicable at present in many cases, but it does offer a solution for certain special problems. The ultimate usefulness of this method has been barely outlined. Its development offers a real challenge to the ingenuity of the dyer.

ACKNOWLEDGMENTS

We are indebted to many individuals and companies for their assistance in this work. In addition to those on the committee and the companies represented by the committee members, we wish to thank the Franklin Woolen Mills, who supplied the worsted yarn, and Richard Colgate and Ralph Miller, who carried out the statistical analysis.

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APPENDIX

SUMMARY OF THE STATISTICAL STUDY——The statistical design used in this study was a Box-Wilson rotatable-type design with axial points and four duplicate runs at the center of the design.

The variables used in the experiment were:

X_1 = Percent butanol
X_2 = Beginning bath pH
X_3 = Temperature of bath (°F)
X_4 = Time in bath (minutes)

The range of the variables in the experimental design was:

Variable	*Minimum*	*Maximum*
X_1	0	6.4
X_2	4	8
X_3	135	205
X_4	4	64

In this study, the response (Y) value was percent of dye on fiber. The same type of statistical design was applied to two different dyes (Acid Black 58 and Acid Red 85).

The equations calculated from the experimental data using a least squares regression analysis technique are:

Percent of Acid Black on Fiber =

$$74.65 + 4.56\left(\frac{X_1 - 3.2}{1.6}\right) - 13.81\,(X_2 - 6) + 10.69\left(\frac{X_3 - 170}{17.5}\right) +$$

$$11.06\left(\frac{\log X_4 - \log 16}{\log 2}\right) - 3.06\left(\frac{X_1 - 3.2}{1.6}\right)\left(\frac{X_3 - 170}{17.5}\right) +$$

$$3.56\,(X_2 - 6)\left(\frac{X_3 - 170}{17.5}\right) + 3.94\,(X_2 - 6)\left(\frac{\log X_4 - \log 16}{\log 2}\right) -$$

$$2.18\left(\frac{X_3 - 170}{17.5}\right)\left(\frac{\log X_4 - \log 16}{\log 2}\right)$$

Percent of Acid Red 85 on Fiber =

$$51.38 + 5.25\left(\frac{X_1 - 3.2}{1.6}\right) - 9.42\,(X_2 - 6) + 13.00\left(\frac{X_3 - 170}{17.5}\right) +$$

$$12.67\left(\frac{\log X_4 - \log 16}{\log 2}\right) + 7.52\,(X_2 - 6)^2$$

These equations were considered "best" in a statistical sense using as a criterion the ability to predict the dependent variable. The regression analysis table for the two dyes follows.

REGRESSION ANALYSIS TABLE

Acid Black 58 Source	Degrees of freedom	Sum of squares	Mean square	F-ratio of significance
Mean	1	94,727.1176		
Regression	8	7,899.0003	987.3750	31.0
Error	8	254.8821	31.8603	
Total	17	102,881.		
Acid Red 85				
Mean	1	93,612.8929		
Regression	5	12,249.7738	2,449.9548	79.5
Error	22	678.333	30.8333	
Total	28	106,539.		

The error mean square is the variance of the prediction. Therefore, from this the standard deviation of any given predicted value can be calculated. An estimate of the overall standard deviation for both dyes would be ±5.5 percent.

AATCC Calendar

COUNCIL, COUNCIL COMMITTEES, RESEARCH COMMITTEES

Jan 28-30 (Hotel McAlpin, New York, NY)
Jan 28—Research Committees
Jan 29—Council Committees, TCR, ECR
Jan 30 (AM)—Council Meeting
May 1959 (Montreal, Canada)

NATIONAL CONVENTIONS

Oct 8-10, 1959 (Sheraton Park and Shoreham Hotels, Washington, DC); Oct 6-8, 1960 (Sheraton Hotel, Philadelphia, Pa.); September 28-30, 1961 (Buffalo, NY); 1962 (Southern Region)

DELAWARE VALLEY SECTION

Dec 4 (Kugler's Restaurant, Philadelphia, Pa)

HUDSON-MOHAWK SECTION

Jan 16 (Jack's Restaurant, Albany, NY); Mar 27 (Chelsea House, Tribes Hill, NY), May 15 (Ladies night, Albany area); June 26 (Annual outing—Antlers Country Club, Tribes Hill, NY)

NIAGARA FRONTIER SECTION

Dec 5 (Buffalo, NY); Feb 20 (Niagara Falls, Ont); April 4 (Hamilton, Ont—joint meeting with CATCC)

NORTHERN NEW ENGLAND SECTION

Dec 5 (Hotel Vendome, Boston, Mass); Jan 16 (Colonial Club, Lynnfield, Mass)

PIEDMONT SECTION

Jan 24 (Poinsett Hotel, Greenville, SC); April 10-11 (Robert E Lee Hotel, Winston-Salem, NC); June 5-7 (Outing—Grove Park Inn, Asheville, NC); Sept 25-26 (Barringer Hotel, Charlotte, NC)

RHODE ISLAND SECTION

Dec 4 (Annual Meeting—Johnson's Hummocks Grille, Providence)

SOUTH CENTRAL SECTION

Jan 10, Mar 21, Sept 19 (Hotel Patten, Chattanooga, Tenn); May 29-30 (Outing—Hotel Greystone, Gatlinburg, Tenn)

SOUTHEASTERN SECTION

Dec 6 (Atlanta, Ga)

WESTERN NEW ENGLAND SECTION

Dec 5 (Rapp's Restaurant, Shelton, Conn)

1958 Intersectional Contest———

CHELATING AGENTS IN RESIN FINISHING*

RHODE ISLAND SECTION

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Variations in wet processing of textiles due to the effect of trace metals have resulted in the development of considerable interest in the subject of chelation and the use of chemicals which inactivate these trace metals. After making a preliminary investigation of the use of chelating agents in various textile applications, it was decided that a study of the effect of chelating agents in resin baths would be the most significant and original.

Laboratory experiments were conducted on mercerized 80/80 cotton fabric using dimethylol urea, dimethylol ethylene urea and methylated melamine-formaldehyde. The chelating agents used were strongly alkaline and therefore it was necessary to overcome this by the use of an increased amount of catalyst. It was determined that the best results were obtained using the trisodium salt of N-hydroxyethylethylenediamine triacetic acid and the pentasodium salt of diethylenetriaminepentaacetic acid.

Washed samples of cotton cloth treated with resin and N-hydroxyethylethylenediamine triacetic acid were dyed with acid and basic colors. The dyeings weere deeper on the samples containing N-hydroxyethylethylenediamine triacetic acid than those not containing this chelating material.

This study has shown that the addition of organic chelating agents to the resin-finishing bath has a beneficial effect upon some of the physical properties of resin-treated fabrics. It was found that the effects in resin finishing varied with the chelating agent and the type of resin used. In many cases, increases in tensile and tear strength and a reduction in damage due to chlorine retention after several washings were observed.

INTRODUCTION

VARIATIONS in wet processing of textiles due to the effect of trace metals have resulted in the development of considerable interest in the subjects of chelation and use of chemicals which inactivate these trace metals. Chelating agents are sequestering agents which bind the metal ions within the chelate ring, thereby removing them from a state in which they would be free for reaction with any other soluble material.

There exists at present a large number of sequestering agents, such as ammonia, cyanide, sugar acids, and polyphosphates. Among the organic chelating agents are ethylene diamine tetraacetic acid (EDTA) and the more recently developed N-hydroxyethylethylenediaminetriacetic acid and diethylenetriaminepentaacetic acid.

EDTA was first made available during the mid-thirties in the United States by Bersworth Laboratories under the name "FRP-26," and in Europe by I G Farben as "Trilon B." Since this time there has been a great increase in the number of manufacturers, and after World War II the use of EDTA in the textile industry increased tremendously. With this increased use of EDTA, deficiencies became apparent which spurred investigations of new chelating agents that would be more effective in sequestering heavy metal salts in alkaline pH ranges. The trisodium salt of N-hydroxyethylethylenediamine triacetic acid and more recently the pentasodium salt of diethylenetriaminepentaacetic acid have been developed and widely accepted for chelating Fe and other heavy metal salts in an alkaline pH range. Thus, today we are able to achieve effective chelation within a wide range of acid and alkaline conditions.

A preliminary study was made using chelating agents in various textile applications. Initial laboratory work was conducted along three lines of investigation:

1) Effect of chelating agents in fabric preparation and bleaching,

2) Effect of chelating agents in dyeing and printing, and

3) Effect of chelating agents in finishing.

New results of this preliminary work in the first two categories confirmed previously published work, but did not show any original or unpublished prospects for further investigation. The work with resin finishes, however, resulted in some interesting data and it was decided to pursue this aspect in greater detail.

A literature search revealed only one reference (*1*) and two German Patent Applications (*2, 3*) claiming increased wet strength and heat resistance. Neither reference supplied much data or conclusive test results. However, all referred only to EDTA as the chelating agent and therefore it was decided that the work of the Committee should be carried on with only this and similar materials.

CHEMISTRY OF CHELATING AGENTS

Chelating agents are compounds, organic or inorganic, which form complexes with metal ions where the cation is held in a cyclic or ring structure. There are a great number of chelating agents. Among the inorganic, the polyphosphates are the best known; in the organic field, only the sugar acids and the aminocarboxylic acids have been widely accepted in textile processing. EDTA is the most widely used aminocarboxylic acid. It binds metallic ions within its structure and inactivates them. (See Figure 1).

Once the metal is bound it is not available for reaction with other materials in solution. The classic example of this is the use of EDTA to soften water and prevent precipitation of calcium and magnesium soaps. EDTA forms strong complexes with heavy metal ions (ie, copper, nickel, cobalt, lead, etc) and also with the alkaline earth metal ions (calcium, magnesium, barium, strontium). Because of this ability to form strong stable chelates with a variety of metal ions, EDTA may be called a broad spectrum chelating agent.

The extent to which complex formation occurs is expressed by the equilibrium constant K using the following equation for the reaction:

$$X^{++} + \text{EDTA} = X\ \text{EDTA}$$

$$K = \frac{X\ \text{EDTA}}{(X^{++})\ (\text{EDTA})}$$

K defines the ratio of X which occurs as X EDTA complexes the X in the ionized state. Where K is very large, the X ion concentration will be low. Using Ca as an example:

$$K = \frac{(\text{Ca EDTA})}{(\text{Ca}^{++})\ (\text{EDTA})} = 3.9 \times 10^{10}$$

The log of K varies from 7.76 to 25 for the alkaline earth metals and the heavy metals (*7*).

The strength of chelation varies

* Presented by William E Aldrich on October 31st at the Conrad Hilton Hotel during the 37th Annual Convention.

with pH. There has been some difficulty using EDTA in a pH range 7-11.5 to control iron. For the control of iron, two newer materials have been made commercially available.

For control of iron in the pH range of 2-11.5 plus the heavy metal salts and alkaline earth metals, the trisodium salt of N-hydroxyethylethylenediamine triacetic acid has been widely accepted for this purpose (*2*). (See Figure 2).

More recently the use of the pentasodium salt of diethylenediaminepentaacetic acid has been used for this purpose (*3*). (See Figure 3).

The advantage of DETAPA is its stability to oxidation.

In the literature there are three references to the use of an EDTA with resins:

1) The modification of cellulose by chemical means. In this paper EDTA was added to the cellulosic-formaldehyde resin bath (*1*).
2) German Application 71938-IVD-8K. This claimed: Cellulose fibers treated with urea-formaldehyde resins containing EDTA have improved wet strength and heat resistance (*2*).
3) German Application 71939-IVC-122. This claimed: Solubility and stability of urea-formaldehyde resins are improved by the addition of EDTA in the manufacture (*3*).

It was noted that there is a similarity between HEDTA and dimethylolurea and dimethylolethyleneurea. (See Figure 4).

It was also noted that the manufacture of these chelating agents employs the use of an amine, cyanide, and formaldehyde.

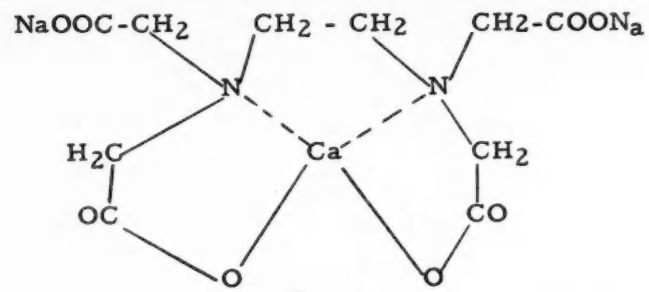


Figure 1
Disodium Ca salt of ethylene diamine tetraacetic acid (EDTA)

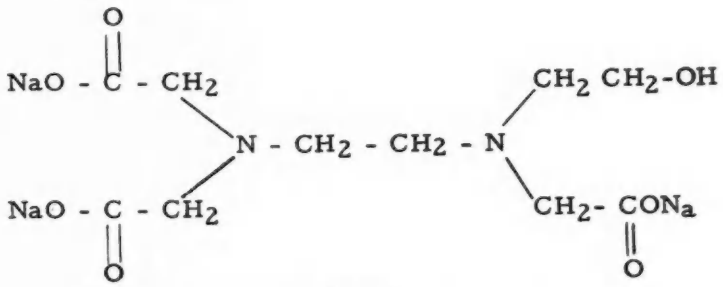


Figure 2
Trisodium salt of N-hydroxyethylethylenediamine triacetic acid (Na_3 HEDTA)

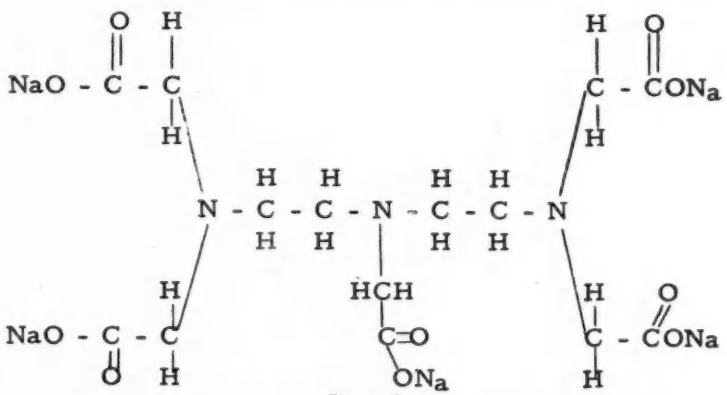


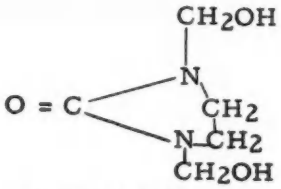
Figure 3
Pentasodium salt of diethylenetriamine pentaacetic acid (Na_5 DETAPA)

EXPERIMENTAL RESIN FINISHING OF COTTON FABRICS

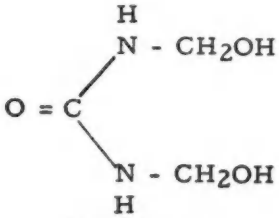
Generally, chelating agents would be used in specific cases to complex known contaminant metals which might occur in a particular water supply or finishing agent. In this investigation a stock solution was prepared which contained several cations as listed in Table I. One percent of this solution was added as a contaminant in the various experiments. No attempt was made to duplicate actual industrial water supplies, but rather the concentrations of the cations were exaggerated in an effort to make their effect more striking.

The simple addition of an alkaline chelating agent to the resin finishing bath would result in high fabric alkalinity. Stam and coworkers (*10*) have shown that this condition can be compensated by increasing the catalyst concentration. It should be emphasized that more than the usual amount of catalyst is required to properly cure a resin in the presence of the sodium salts of aminocarboxylic acids. Accordingly, in the following experimental work the catalyst concentration was adjusted to overcome the alkalinity of the chelating agents used.

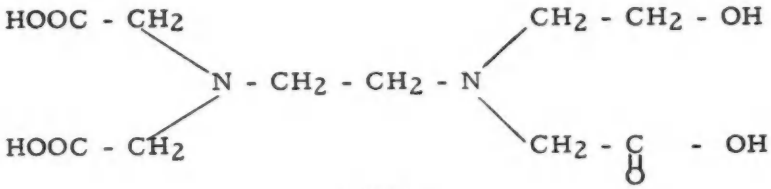
A preliminary experiment was carried out to determine whether the addition of a chelating agent would have any beneficial effect on the appearance or physical properties of fabric treated with a finishing bath containing a chelating agent. Three samples of an 80x80 cotton fabric were treated by the usual methods of resin finishing———padding, drying, curing, afterwashing and drying ———with three resin-finishing formulations. The first contained a modified cyclic urea-formaldehyde resin and an organic acid catalyst, a small amount of silicone and its catalyst, and a cationic softener. The second contained the same finishing agents plus metallic-ion contaminants. The third finishing bath was similar to the second, but a chelating agent was included to complex the excess metal contaminant which had been added. Physical test data seemed to indicate that the addition of the chelating agent to the finishing



Dimethylolethylene urea



Dimethylol urea



HEDTA

Figure 4

bath had produced slight increases of tear strength and breaking strength. An appearance rating was determined after laundering and tumble-drying. The fabric sample treated with the third finishing formulation, containing a chelating agent, was judged to be superior to the other two. (See Table II).

Following the discussion of these preliminary experiments, further work was undertaken, simultaneously, by two laboratories, working independently. One series of experiments was carried out using three different chemical types of formaldehyde resins and the pentasodium salt of diethylene triaminepentaacetic acid.

TABLE I
Metal ion contaminant solution

Cation	*Compound used*	*Solution is—*	*Solution will be, on dilution of 1:99*
Mn++	$MnCl_2 \cdot 4H_2O$	20 ppm	0.20 ppm
Fe++	$FeCl_2 \cdot 4H_2O$	300 ppm	3.00 ppm
Al+++	$Al(NO_3)_3 \cdot 9H_2O$	700 ppm	7.00 ppm
Ca++(10%)	$CaCl_2$ anh	1000 ppm	100.00 ppm
Mg++(10%)	$Mg(NO_3)_2 \cdot 6H_2O$	1000 ppm	100.00 ppm
Cu++	$CuCl_2 \cdot 2H_2O$	20 ppm	0.20 ppm
Cr+++	$Cr(NO_3)_3 \cdot 9H_2O$	5 ppm	0.05 ppm
Ni++	$NiCl_2 \cdot 6H_2O$	5 ppm	0.05 ppm

TABLE II
Effect of adding HEDTA to resin formulation

	Sample		
	1	*2*	*3*
50% Dimethylol ethyleneurea resin	10%	10%	10%
33% Amine hydrochloride	1%	1%	2%
48% HEDTA	—	0.8%	0.8%
MCRA-filling*	128	116	127
Warp tensile (5 washes)	35	41	40
Warp tensile (chlorinated & scorched after five washes)	22	15	31

*Monsanto Crease Recovery Angle (*11*).

The second series of experiments was limited to one formaldehyde derivative, dimethylol ethylene urea, which was included in the previously mentioned series; the chelating agent was trisodium salt of N-hydroxyethylethylenediamine triacetic acid.

A summary of the test data obtained on an 80x80 mercerized cotton fabric is given in the Tables III through V. The concentration of finishing agents and other additives is given in percent on the volume of the finishing bath which was applied at approximately 65% wet pickup on padding. The treated samples were padded, dried on a steam can, cured 70 seconds at 365°F, scoured in a 0.25% soda ash and 0.25% sodium perborate solution for three minutes at 140°F, extracted and finally dried on a steam can. All padding solutions were made up with distilled water.

In Table III, it appears that the addition of Na$_5$DETAPA to the finishing formulation has produced an increase in the tear strength *(12)* of the treated fabric with and without the presence of the added metal contaminant.

The tensile strength *(13)* shows only a slight improvement with the addition of a chelating agent; the fabric sample treated in the presence of Na$_5$DETAPA and added metal ions exhibits greater improvement. The crease recoveries *(11)* of the treated fabrics are at the same levels after five home launderings, indicating that the resin is cured, even in the presence of the alkaline complexing agents.

In Table IV, the physical test data are given for the application work using a methylolmelamine resin. With a melamine resin, the addition of a chelating agent, with and without added metal ions, seems to have no appreciable effect on tensile and tear strength values, or on crease recovery.

From Table V it can be seen that methylated UF resin, containing the chelating agent without added metal ions, produced an increase in tear strength. This increase, however, was gained with loss in durabilty of the crease recovery.

The data from the second series of experiments are given in Table VI. 80x80 cotton fabric samples were padded at approximately 70% wet pickup, frame dried and cured for ten minutes at 320°F. One set of samples was given a "process wash" consisting of one cycle in an automatic washer using 0.1% nonionic detergent and 0.25% soda ash solution. A second set of samples was

given five washes with the same detergent and alkali. After being washed, the samples were frame-dried for five minutes at 250°F. Tests for damage caused by retained chlorine were performed in accordance with standard AATCC procedure *(14)*.

The results in Table VI are similar to the data in Table III in that the addition of a chelating agent of a different chemical type to the finishing bath produced increases in the tensile strength and tear strength. (The damage caused by retained chlorine after successive washings is decreased by the addition of the chelating agent.) These results were noted in the absence of any softening agents.

DISCUSSION

MECHANISM OF Na_5DETAPA REACTION——Na_5DETAPA contains three basic nitrogen groups. Under acid conditions used for curing the formaldehyde resins, it is reasonable to assume that this amino compound is sufficiently cationic in nature to have substantivity for a cellulosic fabric. Thus, it is postulated that Na_5DETAPA becomes part of the resin finish by a physical rather than chemical means. The beneficial effect of this amino compound in resin finishing has been demonstrated, but further experimental evidence, to substantiate this hypothesis, is not available at this time.

MECHANISM OF Na_3HEDTA REACTION——From the chemical structure of Na_3HEDTA it is possible to expect that this compound could react with formaldehyde resins. When these resins are cured, some formaldehyde is liberated which could react with the cellulose or the hydroxyl group of HEDTA under acid conditions *(8)*. Several reaction products are possible wherein the HEDTA is crosslinked by formaldehyde or the resin to another mole of HEDTA or to cellulose.

Assuming that the HEDTA was crosslinked with the resin and/or cellulose, a simple experiment was carried out. Samples of 80x80 cotton fabric were treated with the formulations given in Table VII.

After being padded, cured, and afterwashed, the fabric samples and an untreated cotton control were dyed in separate baths containing 0.5% Acid Blue 25 (*CI* 62055). This particular dyestuff has little affinity for untreated cotton. The fabric samples, resin-treated in the presence of Na_3HEDTA, were dyed a deeper shade than those treated with resin

TABLE III
Dimethylolethyleneurea resin

	Sample 1	2	3	4	5 Untreated Control
50% Dimethylol ethyleneurea resin	12.5%	12.5%	12.5%	12.5%	—
20% Polyethylene softener	0.75%	0.75%	0.75%	0.75%	—
33% Amine hydrochloride	3.0%	3.0%	3.0%	3.0%	—
Metal ion contaminant solution	—	—	1.0%	1.0%	—
Na_5DETAPA	—	1.0%	—	1.0%	—
Tensile w/f (lbs)	31/20	33/23	33/20	34/26	53/37
Tear strength (gms)	352	384	336	400	625
MCRA (w+f)*	273	286	291	271	—
MCRA (w+f) after five home launderings*	266	263	266	265	—

*Monsanto Crease Recovery Angle *(11)*

TABLE IV
Methylolmelamine resin

	Sample 1	2	3	4
Methylolmelamine resin	8.7%	8.7%	8.7%	8.7%
20% Polyethylene softener	0.75%	0.75%	0.75%	0.75%
33% Amine hydrochloride	3.0%	3.0%	3.0%	3.0%
Metal ion contaminant solution	—	—	1.0%	1.0%
Na_5DETAPA	—	1.0%	—	1.0%
Tensile w/f (lbs)	38/27	39/28	40/25	40/26
Tear strength (gms)	464	433	448	448
MCRA (w+f)*	252	263	267	258
MCRA (w+f) after five home launderings*	233	244	235	233

*Monsanto Crease Recovery Angle *(11)*

TABLE V
Methylated urea-formaldehyde resin

	Sample 1	2	3	4
60% Methylated UF resin	11.2%	11.2%	11.2%	11.2%
20% Polyethylene softener	0.75%	0.75%	0.75%	0.75%
33% Amine hydrochloride	3.0%	3.0%	3.0%	3.0%
Metal ion contaminant solution	—	—	1.0%	1.0%
Na_5DETAPA	—	1.0%	—	1.0%
Tensile w/f (lbs)	34/22	29/26	33/21	37/23
Tear strength (gms)	384	480	368	512
MCRA (w+f)*	258	259	269	246
MCRA (w+f)* after five home launderings	261	243	238	244

*Monsanto Crease Recovery Angle *(11)*

TABLE VI
Dimethylolethyleneurea resin

	Sample 1	2	3	4	5 Untreated Control
50% Dimethylolethyleneurea resin	10.0%	10.0%	10.0%	10.0%	—
33% Amine hydrochloride	1.0%	2.0%	1.0%	2.0%	—
Metal ion contaminant solution	—	—	1.0%	1.0%	—
48% Na_3HEDTA	—	0.8%	—	0.8%	—
Warp tensile (lbs) (unwashed)	39	40	42	39	63
Warp tensile (lbs) (five washes)	35	40	41	39	57
Warp tensile (lbs) (chlorinated & scorched)	35	39	40	40	59
Warp tensile (lbs) (chlorinated & scorched after five washes)	22	31	23	28	54
Tear strength (gms) (unwashed)	240	304	272	304	560
Tear strength (gms) ("Process Washed")	256	304	304	320	464
MCRA-filling (unwashed)*	126	130	132	128	—
MCRA-filling* ("Process Washed")	128	127	120	127	—
MCRA-filling* (five washes)	127	123	129	124	—

*Monsanto Crease Recovery Angle *(11)*

TABLE VII
Resin-finishing formulations

	Fabric Sample 32	35	39	43
50% Modified cyclic UF resin	15%	15%	15%	15%
30% Organic catalyst	3.6%	3.6%	3.6%	3.6%
48% HEDTA	—	1.2%	—	1.2%
Metal ion contaminant solution	—	—	1.0%	1.0%

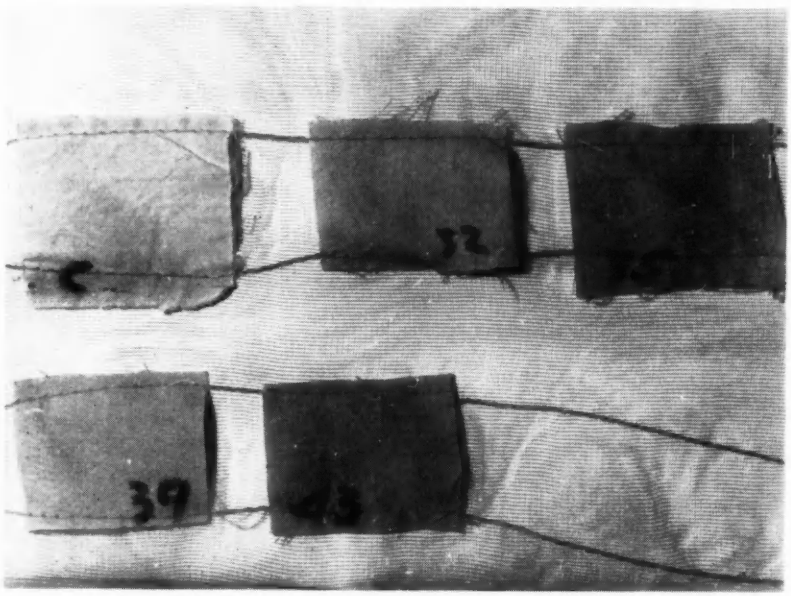


Figure 5

Top row (l to r):
1) Control (80 x 80 cotton), dyed only [with Rhodamine B (CI Basic Violet 10)]
2) Same as 1, plus resin
3) Same as 1, plus resin and HEDTA

Bottom row (l to r):
1) Same as 1 (top row) but dyed with Anthraquinone Blue SWF (CI Acid Blue 25), plus resin
2) Same as 1, plus HEDTA also.

alone. (See Figure 5). The untreated control was barely stained. The increased affinity of this dyestuff is attributed to the presence of the amino groups from HEDTA. It appears that the HEDTA has become part of the resin finish.

As further evidence of this point, fabric samples, treated as described in Table VII, and an untreated cotton control were dyed in baths containing 0.05% Basic Violet 10 (*CI* 45170). This color has comparatively little affinity for untreated or resin-treated cotton. However, when HEDTA was incorporated in the resin bath, the affinity of this dyestuff is approximately doubled. (See Figure 5). This is an indication of the presence of carboxyl groups for which basic dyes have a definite affinity. These carboxyl groups must stem from HEDTA, which, when used in conjunction with a UF resin, is attached to the cotton, probably through co-reaction with the resin.

EXPLANATION OF IMPROVED TEAR STRENGTH———Under normal acidic conditions of resin finishing, a certain amount of hydrolysis of the cellulose has to be expected. Gagliardi *(9)* has demonstrated that the loss in tensile strength of a resin-treated cellulosic fabric decreases as the basicity of the resin increases. By the addition of either Na_5DETAPA or HEDTA to the resin-finishing bath, the basicity of the resin is increased and the resulting buffering action tends to minimize acid fiber damage on curing. This mechanism is offered as an explanation of the improvement of tear strength obtained when the formaldehyde resins were cured in the presence of particular chelating agents which contained basic nitrogen groups.

CONCLUSIONS

This study has shown that the addition of organic chelating agents to the resin finishing baths has a beneficial effect upon some of the physical properties of resin-treated cotton fabrics. The improvements in physical properties obtained were related both to the type of resin and to the type of chelating agent.

1) The addition of pentasodium salt of diethylenetriaminepentaacetic acid to dimethylolethylene urea-formaldehyde resin and methylated urea-formaldehyde resin baths improved both tensile and tear strengths at the same levels of crease recovery.
2) The addition of pentasodium salt of diethylenetriaminepentaacetic acid to a methylol-melamine-formaldehyde resin bath had no appreciable effect on tensile strength, tear strength, or crease recovery.
3) The addition of trisodium salt of N-hydroxyethylethylenediamine triacetic acid to a dimethylolethylene urea-formaldehyde resin bath improved tensile and tear strength but had no appreciable effect upon crease recovery.
4) The addition of trisodium salt of N-hydroxyethylethylenediamine triacetic acid to a dimethylolethylene urea-formaldehyde resin bath improved the resistance to chlorine after successive washings.
5) There is a reaction between the HEDTA and urea-formaldehyde resins.

This study is a new approach in improving the physical properties of resin treated cotton fabrics. The work presented covers only the initial studies and opens a field for further investigation.

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New Bedford Institute of Technology
Newport Finishing Corp
Owens-Corning Fiberglas Corp
Revere Copper & Brass Co.
Rumford Chemical Works
Chas S Tanner Co

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1958 Olney Medal Luncheon———

HENRY EDMOND MILLSON—15th OLNEY MEDALIST*

WILLIAM H BOWMAN
General Manager
Organic Chemicals Div
American Cyanamid Co

CHAIRMAN Stearns, President Linberg, Honored Guests, Ladies, and Gentlemen—and of the last-named group, I refer especially to those who favor vat-dyed colored shirts for daytime wear!:

This opportunity of saying something nice about your fifteenth Olney Medalist is one that I greatly appreciate.

All of us in American Cyanamid Company are, of course, very proud of Henry Edmond Millson. Your recognition of him today makes us extremely happy. It demonstrates that you, too, share our high opinion of his work and of his person.

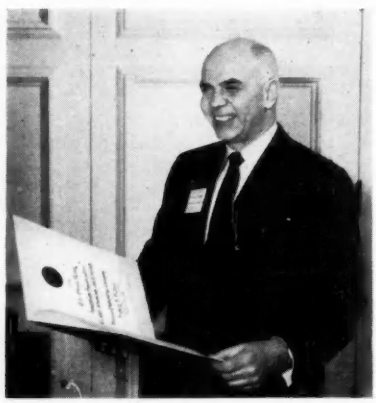
I must confess it has *not* been my good fortune to have had the stimulus of a long-standing acquaintanceship with your medalist. For me, this privilege has had to be confined within the relatively short space of three years.

But the impact of his personal charm and scientific dedication was—and is—so great that, on my very first exposure, I was instantaneously catapulted into life membership in the "Harry" Millson club. To borrow a phrase from the realm of the popular song, you might even say that "I'm just wild about Harry!"

As a "Johnny-come-lately," however, I am terribly conscious of the obvious fact that there are many others much more deserving of this opportunity to eulogize your medalist. On the other hand, you may be sure that I was careful, in protesting my relative unworthiness for this assignment, to avoid being so overly vigorous about it as to run any chance of having the invitation withdrawn.

This was because the prospect of being with you here today was, to me, a mighty pleasing one. I felt that you were permitting—even encouraging—the return to grace, of an exile who had strayed from the straight and narrow path.

Seventeen years ago, I began to attend some of your meetings. It was for example, my great pleasure to have been with you at the awarding of the *first* Olney Medal back in 1944.



William H Bowman

But thereafter, the particular vineyard in which I was laboring was of such a character that, for a period of several years, I fell into evil ways and wandered from the fold.

On joining the Organic Chemicals Division of our company in 1955, however, it was relatively easy for me to see the light because I was literally surrounded by members of your association.

One of these was Ed Stearns, who is so ably conducting this Medal Award Luncheon. Another is Foster Pepper, who must certainly be basking in reflected glory today! Another is your vice president from the Southern Region, that enchanting raconteur and bon-vivant, H Gillespie Smith.

So you can see why—at long last—I have the feeling of being happily back home with kinfolk.

And—speaking of family relationships—I am glad to be able to tell you that just a little less than sixty years ago (but just a few days too late to be a Christmas present to his mother) our distinguished medalist was launched upon his career.

The word "career", however, falls sadly short of what is needed to characterize the activities of Harry Millson. Because he is a guy who has—all his life—been juggling so many balls in the air that it is difficult for a by-stander to see the sun in the sky.

The place where all of this started back in 1898 was Philadelphia. And it was in this same fair city that our hero—after flashing like a meteor through its public schools—entered into one of his many *formal* fields of activity by enrolling at the Philadelphia Textile Institute.

Meanwhile, back at the ranch—as those of you who remember the old-time western movies will appreciate—all sorts of things had been going on. This was because Harry Millson was a boy scientist of fabulously far-ranging interests.

Unlike most of us who pick up—and just as quickly drop—one enthusiasm after another, Harry would really dig into things, carefully nurturing and developing *all* of his interests.

His was no flash-in-the-pan, dilettantish sort of performance. Hobbies which saw the light of day when Harry could do little more than toddle around, have grown to such a point that Harry is now an acknowledged expert in several diverse fields.

I know full well that you are recognizing Harry Millson today for his many and outstanding contributions to the field of textile chemistry. But I cannot help feel that you are also recognizing the whole of the man. So, before returning to the story of the textile chemist who is your medalist today, I know that you would wish me to fill in with some picture of his many other activities.

As I said before, Harry was a boy scientist, and one of no mean proportions. At the tender age of seven, he swiped the kitchen box of mixed, unground spices and very carefully planted them. With loving attention, they grew into the most fantastic things that he—or anyone else in his town—had ever seen. Indeed, so interesting and remarkable were those plants that Harry's father would let *no* one touch them.

This early interest in growing things led to Harry's hobby of hybridizing gladiolus, as well as to his important work of studying and iden-

* Presented October 30, 1958, at the Conrad Hilton Hotel, Chicago, Ill, during the 37th National Convention.

tifying soil composition. For some years, he has been actively engaged in lecturing to horticultural societies on these subjects, and now devotes some time to growing new varieties of geranium.

Despite his love for growing things, he knew, from a very early age, that he was destined to be a mineralogist or a chemist. Actually, he has followed both professions from the time that he picked up a shiny stone and began to subject it and other minerals to all kinds of scientific scrutiny.

This activity naturally *had* to include the traditional basement laboratory and the chemical analysis involving hydrogen sulphide. One such experiment took place while the house was full of family and friends. When Harry went back upstairs to socialize, he found himself greeted by a scene of desolation. Everyone had fled, leaving all doors and windows wide open.

The incident would not have been so serious under normal circumstances. In point of fact, however, Harry and his mother were merely boarders! And this, you will agree, could put a fairly cold, harsh light on the escapade.

His real attachment to the field of mineralogy was the study of fluorescence and phosphorescence. His initial source of illumination was the burning magnesium ribbon. This gave way later to much more sophisticated ultra-violet lamp experimentation. As time went on, Harry added a great body of practical exploratory and developmental knowledge to this relatively uncharted field.

Indeed, he was once known far and wide as the result of a popularized version of some sober scientific work he published with his son.

Those of you, who—in this age of television—remember the radio, may recall the program, "Answer Man."

The question asked was, "Are there any scientists who do most of their work in bed?" You guessed it. The answer was "Yes". And the scientist was none other than our good friend, Harry Millson.

For more elaborate detail, look up the December 1950 issue of *Industrial and Engineering Chemistry*. In the meantime, here is the abridged version.

When Harry really got into this matter of mineral phosphorescence. it was most unusual for minerals to store very much energy under excitation. In fact, the emission of light would continue for only a short period of time.

After investigating literally thousands of minerals and lots of different wave-lengths in the ultra-violet spectrum, however, Harry found some combinations that would permit continued emission for years. One specimen is still glowing after eighteen years!

The Medalist at work in the laboratory

At that time, however, he never knew how long the emission would last. So, being an experimental purist, he carted his irradiated minerals all over the country with him as he visited his customers in the textile industry.

The emission test required absolute darkness. Furthermore, the experimenter's eyes had to be dark-adapted beforehand. What better or more comfortable place to meet these requirements than in bed!?

Harry's procedure was to bury himself cozily under several layers of blankets and wait for absolute darkness—sometimes waking everybody up with his alarm clock at 2:00 AM—before carefully opening his black bag and unwrapping his beloved samples. At the very least, this represented strange bedfellowship, indeed!

Now let's return to Harry Millson, the textile chemist we know so well, to see what happened to him after he completed his studies at the Philadelphia Textile Institute in 1918 and served a few months in the Army at the tail-end of World War I.

He went to work in Philadelphia at the Commission Dye House of T A Harris Company, and this relationship lasted until 1937—a period of nineteen years.

But your medalist was far too energetic to be satisfied with just *one* job. So, in those early days, he gained some additional experience in the solution of chemical problems of the textile industry by acting as a technical service consultant to two other companies—Schuykill Chemical and Kali Manufacturing!

Despite this whirl of activity, Harry was evidently able to devote *some* time to the successful courting of Miss Florence Keys. For, in 1922, she became Mrs Millson and entered upon a career, not merely as wife and mother, but long-suffering experimental assistant as well.

That Florence Millson has been a constant source of inspiration to your Medalist is quite clear from conversations I have had with Harry and with several of his fellow employees. And I am sure that you would wish me to give special recognition to her presence among us today. In this connection, I know, too, that you would grant me the privilege of Harry's fellow employees at Bound Brook, who have arranged a splendid momento of this happy occasion. And so, Mrs Millson, as the representative of these worthy gentlemen, I take very great pleasure in presenting to you this fine likeness of your husband.

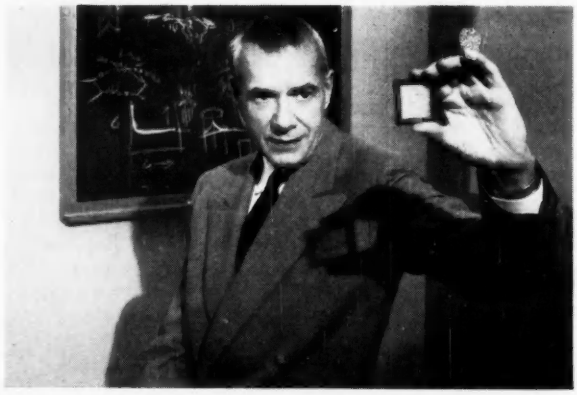
Thank you, Mrs Millson.

The Millsons have one son, Henry Junior. He has followed in Harry's footsteps not only in respect of scientific competence but also of far-ranging interests. He holds a doctorate of the University of Michigan and a law degree from Rutgers. He, too, was drafted as an experimental assistant by Harry, Senior, and is the co-author of that paper, "Observations on Exceptional Duration of Mineral Phosphorescence," to which I made earlier reference. Now married and a patent attorney with Esso Standard Oil, he has made an actively practicing grandfather of your medalist—for their little daughter just turned the ripe old age of four last April.

When Harry started work with the T A Harris Co, vat dyeing was just coming of age and rayon was the only synthetic fiber then available. Harry predicted that synthetic fibers would grow in importance and that dyeing practices would gradually become more susceptible to the application of scientific principles.

He was concerned with the paucity of literature on dyeing and with the practice of dyemasters' carrying all of their dyeing methods and formulations in a jealously guarded black book. He felt that discoveries of a fundamental nature should be the property of the industry, not a personal possession like the discovery of a new salad dressing by the chef at the Pavillon!

He has spent the greater part of his life correcting this situation, adding much to the literature of dyeing.



(Left): The Medalist inspects a color slide. (Right): Inspecting recent dyeings at the Dyes Technical Service Laboratories at Bound Brook are (l to r): James Dimmicci, assistant to Mr Millson; the Medalist; Louis I Fidell, and Ormand W Clark.

American Cyanamid Co is proud that the major part of Harry's work was carried on during the nearly twenty-one years he has been a member of our dyes department.

Harry rose successively in that organization from manager of the Philadelphia Dyes Laboratory to manager of the entire Dyes Technical Service Laboratories at Bound Brook, New Jersey.

Now—an elder statesman among our scientific personnel—Harry is not chained down to any specific managerial tasks but is free to do missionary work along any lines he feels show promise. He is really a crusader, now, trying to introduce as much science as he can into the art of dyeing.

He is a fervent promoter of greater reproducibility in dyeing practice. He wants more dyers to die in bed of old age instead of collapsing at work from apoplexy!

He has authored or co-authored more than fifty papers. (Several of these were in association with George Royer, whom you honored with the awarding of your seventh Olney Medal in 1950.)

As a practical scientist, Harry has a most imposing list of "firsts". Here are a few of them:

1) The use of radio-active isotopes in the investigation of the dyeing process.
2) The use of black and white, as well as color, phosphorographs, which are really filmed recordings of mineral phosphorescence.
3) The study of phosphorescence of textile fibers as a means of detecting damage.
4) The development, with "Shine" Mooradian—now of Geigy—, of a new pH indicator for use in dyebath control. (They were granted a patent on this.)
5) The development of the familiar dye cost tables, designed to help nonslide-rule users arrive at estimated dye costs. (This Herculean task was almost equivalent to calculating the table of logarithms.)
6) With Dr Hal Lacey, the discovery of a chemiluminescent material suggested by the firefly's bioluminescence. (This was invented for use by the Navy for night-time water markers.)
7) With Dr Les Turl—now of the Canadian Defense Research Medical Laboratories—, the invention of the microdyeoscope, that quite remarkable optical machine which showed, for the first time, the action of chemicals and dyes in the dyebath and their effect upon textile fibers. (Harry has permitted me to say that, a little later on he is going to show you his latest Kodachrome Time-Lapse motion pictures of dyeings actually taking place in the high-temperature microdyeoscope. In this connection, I hope he tells you something about another one of his long-suffering friends and experimental assistants. This is Edwin Skidmore—a mechnical genius—in whose garage Harry conducts a great deal of his more esoteric experimentation.)
8) Another first, this time with Matthew Babey — now with Atlas Electric Devices—was the invention of the perspirometer for testing the fastness of dyed materials on exposure to perspiration. (How would *you* like to be a perspiration donor? Well, Harry subjects all of his family and their friends to that stimulating experience. He gets them out in the hot sun and wraps them up in heavy blankets after arranging porcelain spot plates or other receptacles on various portions of their anatomy!)
9) As an early pioneer in fluorescence and phosphorescence, Harry invented and developed the fluorescent carpet, which helps you avoid falling on your face in darkened movie palaces.
10) He was the first to do longitudinal sections of fibers which, with the help of the microdyeoscope, are showing the penetration of dyes into fibers.

From this small sampling, you see portrayed the man—and the boy—who is to receive the fifteenth impression of your Olney Medal. We believe you will agree that Harry is a rather special sort of individual.

At American Cyanamid Company, we believe there is a place in big business for people like Harry. They are the ones who question, search, innovate. They are the pioneers who break new ground and chart new paths to show the rest of us the way.

As we think of Harry's accomplishments in the slightly more than twenty years he has been with us, we look with positive awe at the prospect of his further achievements in the *next* twenty years.

We know that—as the proud recipient of its fifteenth striking—he will not dim the luster of the Olney Medal.

And now, President Linberg, having eulogized your 15th Medalist, I take great pleasure in relinquishing this microphone in order that you might proceed with the really important part of this luncheon meeting.

Thank you.

* * *

At this point, presentation of the Olney Medal to Mr Millson was made by AATCC President Linberg.

Address of the 1958 Olney Medalist———

THE CHALLENGE OF TODAY*

HENRY E MILLSON
Dyes Technical Service Laboratories
Organic Chemicals Div
American Cyanamid Co

Ladies and Gentlemen:

It is going to be very difficult for me to tell you how happy and grateful I am to have been chosen to receive the Olney Award. This is an occasion when a man can quite properly feel both pride and humility—pride because I could hardly deny my feeling at receiving this medal, and humility because of the help I have received along the way from my colleagues.

There is an old story about the author who dedicates a book to his wife with the inscription : "To my loving wife, without whose encouragement and help this book would have been finished five years earlier." This fortunately, is not the case with me. For many years I have spent a very large part of my time in research, in experiments, in writing articles and preparing lectures. These were years taken out of the time I might have spent with her, but she has never complained. There should be a special medal for the long-suffering wives, the wives who not only love, but understand so well.

Modern research, as so many of you know well, is rarely nowadays an individual effort. In certain areas, directed group effort is of incalculable help. Much of my work has been as a member of such a team. Many people at Cyanamid have worked directly with me, or have offered friendship, help and knowledge. Mr Klipstein, one of the present two executive vice-presidents of Cyanamid, was in charge of Application Research during the development of the first Microdyeoscope. His enlightened understanding and support helped us through the early days.

It has been my good fortune also to be associated with late Dr Kienle and Drs Royer, Peiker, Stearns, Cooke, Leavitt, Turl and Long. Chester Amick, Elmer Glaeser, Matthew Babey and James Dammicci have helped me greatly in testing and

Henry E Millson

in fastness evaluations in the assembling of data required for the writing of articles.

Research of this kind must be backed by a progressive, research-minded company, such as American Cyanamid. It takes courage and belief in the future to allot money for investigational project which may never pay off. It has taken more courage and belief in recent years because of the reduction in profit and the lower consumption of dyes by the textile industry. I consider myself very fortunate to be part of a great chemical company whose outlook makes possible so much fundamental and applied research work.

However, if textiles and dye technology are to grow in the future, one great problem must be dealt with decisively. It is a problem which has concerned me seriously as I have watched it develop. It is simply the dwindling interest on the part of young people in making the field of textiles their life's work. Fewer textile courses are being given at the colleges. Classes have so decreased in size over the past ten years that the graduating classes have few students to offer the textile industry. In short, the young people are turning away from textiles to other fields.

Why? Is it because the textile industry is not offering incentive enough to the better brains and talents to bring them into the work? With the loss of talent the situation grows worse. If we fail to train men who can originate and explore, we will fall behind and become mere copyists—we will lose the leading place we have held so long and have begun to take for granted.

The textile industry can provide stable and satisfying careers for the skilled and able men it needs. It can erase the depressing thought that the romance and thrill of discovery have disappeared from its work.

The best is yet ahead. There are frontiers in our work with fibers and dyes which have yet to be reached. The age of discovery is just beginning in the science of dyeing and finishing textiles. Of the 21 or more fibers in use today, at least 15 were developed since World War II. Some of the problems presented to the chemist by the creation of these new fibers have been solved. For example, polyester and acrylic fibers proved very difficult to color and the dyeings lacked fastness. Dye chemists met the challenge with the discovery and development of improved disperse and cationic dyes.

Even fibers like wool, which have been dyed for thousands of years, still present new challenges to the dyer and dye chemist. Until recently the best fastness on wool was obtained with chrome dyes applied by a meta- or top- chrome procedure. Both of these methods left much to be desired because of long dyeing cycles and the difficulty of overcoming tippiness. The dye chemist solved this problem with the neutral dyeing premetallized dyes which have superior fastness to many of the older chrome dyes.

One of the newest developments is the fiber-reactive dye—a new concept in dye chemistry. It approaches

* Presented October 30, 1958, at the Conrad Hilton Hotel, Chicago, Ill, during the 37th National Convention.

vat dyes in fastness but requires only a simple, inexpensive method of application, similar to that of direct dyes. And these, the direct dyes, have been so markedly improved in recent years as to begin to challenge the hitherto unbeatable vat dyes, although the vats are still king.

The important point about all this is that most of these discoveries have occurred within the past ten years, together with the development of new finishes like the melamines and purifying finishes which give the manufacturer a new range of products. And with all this discovery, problems remain, and new, superior dyes are still to be discovered.

The romance and challenge have not disappeared from the textile industry. Dyers and finishers need more help today than ever before. Discovery follows discovery with such lightning speed that little is known of one group of dyes, fibers, of finishes, before an entirely new material or a major improvement is introduced.

Young people who want scientific challenge and romance can find it in the dye and textile fields. Technically trained chemists and colorists dedicated to their tasks will still make the discoveries of the future. It is the job of the textile industry to provide rewarding careers for such men, and to profit from their accomplishments. The chemical industry will do its part.

It has been my experience that the unexpected by-products of research are sometimes more valuable than the solution of the original problem. Solving a problem sometimes creates other problems equally difficult, but this is part of the challenge which drives men to achieve the seemingly impossible. And this is what makes the future such an exciting challenge. There is more yet to be done than we have already done.

Can we create fabrics which will actually air-condition their wearers? Can we produce a cotton with increased heat endurance and elongation, and with a better affinity for dyes? Can we develop completely wrinkle-free fabrics and dirt repellent finishes?

We will. I have no doubt we will. The coming years will see new materials, new processes and techniques, new markets—whole new families of ideas.

A few minutes ago, Dr Bowman was kind enough to express anticipation for my achievements of the next twenty years, which indicates he has as much faith in the future as I have.

The challenge is there.

The future is ours to use.

There is still a great deal to be done.

Now I should like to show you our latest Kodachrome Time-Lapse motion pictures of dyeings taken through the Microdyeoscopes.

The Olney Medal is a heavy cast piece bearing a likeness of Dr Louis Atwell Olney, founder of the AATCC, on the front, and a simple inscription on the reverse side. The award is endowed by Howes Publishing Co, Inc, New York, and is awarded by an AATCC committee to any citizen of the USA as recognition for "outstanding achievement in the field of textile chemistry, including the development of chemical agents or chemical processes used in the manufacture of textiles, or methods for their evaluation."

Details of published works and professional qualifications of those proposed each year for the medal are usually contained in nominating briefs delivered to the Awards Committee. This Committee then considers those nominated and makes a final choice.

Under rules agreed to by the Association and Howes Publishing Co, Inc, the award must be made by unanimous decision of the committee of five, which includes: The Association president (ex-officio); a member of the faculty of an educational institution awarding chemical degrees; an employee of a concern manufacturing chemical products used in textile wet processing; an employee of a concern manufacturing textiles; a member at large of the Association.

THE OLNEY MEDAL

Previous winners of the Olney Medal are:

1944—Louis A Olney
1945—Milton Harris
1946—William H Cady
1947—Edward R Schwarz
1948—Harold M Chase
1949—Charles A Seibert
1950—George L Royer
1951—Raymond W Jacoby
1952—Werner von Bergen
1953—Roland E Derby
1954—William D Appel
1955—Miles A Dahlen
1956—Walter J Hamburger
1957—P J Wood

PIEDMONT SECTION WINS 19th INTERSECTIONAL CONTEST

THE Piedmont Section became the first to win the annual Intersectional Prize Paper Contest three times in succession with its entry, "The Effect of Thermal Treatments on the Dyeability of Thermoplastic Yarns", at the 37th National Convention. The paper was judged the best of five entries in the 19th Annual Contest, which was held in the Grand Ballroom of the Conrad Hilton Hotel, Chicago, Ill, on Friday afternoon, October 31, 1958.

The paper is the fifth first-prize winner from the Piedmont Section since the inception of the Contest in 1940. An annual competition, the Intersectional Contest pits the research committees of the participating Sections, which work throughout the year in the preparation of research papers on current topics of interest to the industry.

Fred Fortess served as the Piedmont Section's Contest Committee chairman this year, while Neal A Truslow served as speaker and project chairman.

Second-place honors went to the Delaware Valley Section for its entry, "Carrier-assisted Dyeing of Hydrophilic Fibers", which was presented by Donald P Hallada. Harold P Landerl served as chairman of the Delaware Valley Committee.

Third-place honors went to the Rhode Island Section for its paper, "Chelating Agents in Resin Finishing", which was delivered by William E Aldrich. William J Cooney headed the Section's Committee.

Also competing in the Contest were the Southeastern Section with its entry, "The Influence of Ginning Conditions and Subsequent Fiber Preparation on Certain Properties of Cotton Fibers", and the Mid-West Section, with its entry, "The Influence of Additives on Soiling and Soil Removal Characteristics of Knitted Fabrics". Frederick T Lense served the Southeastern Section as chairman and speaker, while for the Mid-West Section Lee G Johnston served as chairman, and James E Miller handled the speaking chores.

In addition to its five first-place awards, the Piedmont Section has had one second-place entry and two third-place entries for a cumulative total of 32 points in the 19-year history of the Contest.

Rhode Island, with its third-place finish this year, brings its point total up to 49 to continue its commanding lead in this respect. Rhode Island's accomplishments in the Contest over the years include seven first-place finishes, two second-place finishes, and four third-place finishes.

Delaware Valley, with its sixth second-place finish, has pulled up to within one point of the Metropolitan Section, which holds second place in the cumulative standings with 36 points. Delaware Valley also has one first-place and six third-place finishes to its credit.

The cumulative standings are as follows:

Rhode Island	49
Metropolitan	36
Delaware Valley	35
Piedmont	32
Northern New England	23
Washington	8
Southeastern	7
Others	0

The decision of the judges regarding the 1958 Contest winners was announced by Thomas J Gillick, chairman of the Intersectional Contest, at the Annual Banquet held Friday evening, October 31st.

Chief justice of this year's Contest was Albert H Rant. He was assisted by the following judges representing Sections: Louis B Cook, Delaware Valley; Allen J Rooney, Hudson-Mohawk; Kenneth Giese, Mid-West; John J O'Neill, Northern New England; Victor S Salvin, Piedmont; Raymond B Taylorson, Rhode Island; Frank H Cooper, Southeastern; Matthew G Bruckman, Metropolitan; Henry J Crail, South Central; Louis Mizell, Washington; and Raymond J Carey, Western New England.

Elected to Membership

SENIOR

George A Bates
P Belmont
Justus A Belville
Walter Benoliel
Cleo M Cottrell
David S Cruickshank
James H Edgar
Bill G Estes
Fred F Hand
Paul E Hurley
Richard E Komoski
Jean-Louis Lacerte
Vernon G Morton
Edward R Needham
Nicholas Vukmirovic
Dara Whitman

ASSOCIATE

Howard A Fromson
Albert E Gastrock
Charles T Schieman Jr
Renshaw Smith
Emalyn F Turner

JUNIOR

Thomas A Brophy
Eugene Hannah

STUDENT

Joseph F Allums
Jack W Harris
Joe E Voss

CORRECTION

On page 464 of the 1958 *Technical Manual*, Benjamin S Bellemere was listed as President, Belle Chemical Co, Inc. This should be corrected to: Owner, Bellemere & Company.

COLOUR INDEX IS COMPLETE. ORDER NOW!

ACTIVITIES OF THE LOCAL SECTIONS

Northern New England

MORE than 160 members and guests attended the October 17th meeting of the Northern New England Section, held at the Quartermaster Research & Development Center, Natick, Mass, with Chairman Edward B Bell presiding.

Stephen J Kennedy, research director for textiles, clothing & footwear, QM Corps Research & Development Command, made the local arrangements. He introduced Colonels Wafford and Whitney of the Natick labs, who were honored guests.

Speaker of the evening was John T Taylor, manager, New Product Development, Rohm & Haas Co, who discussed "Nonwoven Fabrics — The Technology of Bonding Agents". Mr Taylor described the numerous types of chemicals and auxiliaries required in the production of nonwoven fabrics. He also discussed the properties and chemistry of thermoplastic and thermosetting binders.

Vice chairman Robert D Robinson announced that the Section's December 5th meeting at the Hotel Vendome would feature an outstanding panel, which will discuss "Polymers as Related to Fabric Processing".

Pacific Southwest

THE Pacific Southwest held its 1958 Outing on October 1 at the Fox Hills Country Club, Culver City, Calif, with 62 members and guests participating in the golf tournament and the sports night.

Door prizes and golf awards donated by suppliers were keyed to the theme, "Buy Textiles", and consisted of knitted sportswear.

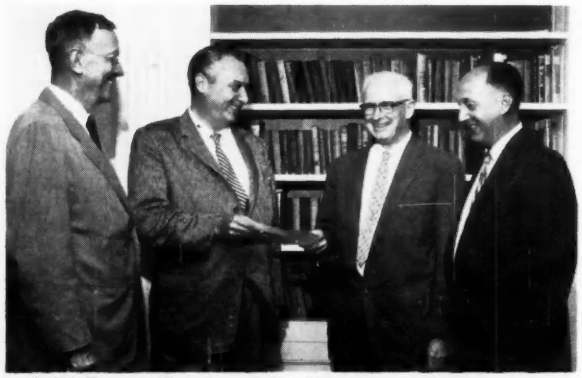
Arthur "Red" Patterson, public relations director for the Los Angeles Dodgers baseball team, was the guest speaker.

Delaware Valley

THE Delaware Valley Section met September 12th at the DuPont Country Club, Wilmington, Del, with Chairman William Sollenberger presiding. The regular meeting was preceded by a trip through the DuPont Company's textile research laboratories.

Speakers of the evening were George M Gantz and W G Sumner, General Aniline & Film Corp, whose paper, "Textile Applications of Nonionic Surfactants", appeared in the October 20th issue of *American Dyestuff Reporter*. The paper covers the structure and properties of various classes of nonionics and details the performance characteristics in wet processing.

Arthur W Etchells, chairman of the Section's Educational Committee, presented a check for $350.00 to A W France, dean of faculty, Philadelphia Textile Institute, the amount representing surplus funds from the operation of the course on "Colloids and Emulsions" sponsored by the Section.



A W France (3rd from left) PTI dean of faculty, receives check from A W Etchells, chairman of the Delaware Valley Section's Educational Committee, as Committeemen R B Stehle (left) and T H Hart look on.

E G Haack (center), program chairman, thanks D C Newman (left) and M W Goodell, of the Du Pont Company, hosts at the September 12th meeting.

Chairman W S Sollenberger (left) and Program Chairman E G Haack (extreme right) chat with guest speakers G M Gantz (2nd left) and W G Sumner.

Membership Applications

SENIOR

Joseph A Charlton—Dyer, Hampshire Woolen Co, Ware, Mass. Sponsors: G O Linberg, H E Glidden. (NNE).

Paul L Calloway—Overseer of dyeing, Wennonah Cotton Mills Co, Lexington, NC. Sponsors: H H Field, E O Sherrer. (Pied).

C Edward Dorton—Dyer, Craftsman Finishers, Concord, NC. Sponsors: R A Bruce. R H Smith. (Pied).

Paul G Dyson—Head dyer, The Powers Mfg Co, Waterloo, Ia. Sponsors: W Boyd Jr, W H Sites. (MW).

Frank S Fayssoux—Dyer, Southern Bleachery & Print Works, Taylors, SC. Sponsors: G O Linberg, W E Fayssoux. (Pied).

Arthur L Flinner—Supt, Finishing Div, Millville Mfg Co, Millville, NJ. Sponsors: B F Johnson Jr, R E Nickerson. (DV).

L R Graybeal—Head, finishes & finishing research, American Enka Corp, Enka, NC. Sponsors: H L Reed, T R Scott Jr. (Pied).

Ronald Hartas—Mill mgr (dyeing & finishing), Bradford Cotton Mills Ltd, Sydney, NSW, Australia. Sponsors: J A Hopwood, R H Griesser.

Wendell C Hildenstein—Vice president, production mgr, Art Textile Corp. Highland, Ill. Sponsors: J L Eich, R W Deobler. (MW).

Joseph L Huckabee—Textile salesman, Wallerstein Co, Inc, New York, NY. Sponsors: J J Casserly, J A Clark. (Pied).

Ferdynand Huttner—Dyeing & finishing mgr. Bradford Cotton Mills Pty Ltd, Melbourne, Victoria, Australia. Sponsors: James A Hopwood, R H Griesser.

Joseph Lowe—Mgr, Bradford Cotton Mills Ltd, Melbourne, Victoria, Australia. Sponsors: J A Hopwood, R H Griesser.

John E McMurray—Asst regional sales mgr, Diamond Crystal Salt Co, St Clair, Mich. Sponsors: C H Morris, T R Smith.

Richard W Meuse—Chemist's asst, E I duPont de Nemours & Co, Inc, Chicago, Ill. Sponsors: J G Kelley, J M Remsen. (MW).

Louise Peach—Mgr, Testing Lab, Marshall Field & Co, Chicago, Ill. Sponsors: I Didier, O Nelson. (MW).

Homer L Robson—Research chemist, Olin Mathieson Chem Corp, Niagara Falls, NY. Sponsors: G O Linberg, H E Glidden. (NF).

John S Robinson—Sales rep, Becco Chem Div, Buffalo 7, NY. Sponsors: B K Easton, N Weinberg. (NNE).

Frank J Rogan—Plant mgr, Cluett, Peabody & Co, Waterford, NY. Sponsors: D O Hamer Jr, W A Nelson. (HM).

Thomas L Rusk Jr—Tech sales service specialist, Chemstrand Corp, New York 1, NY. Sponsors: J E Loughlin, H A Weil. (Met).

Albert Thomas—Manager (dyeing & bleaching), Bradford Cotton Mills Ltd, Sydney, Australia. Sponsors: J A Hopwood, R H Griesser.

Richard I Tucker—Dyer, Linwood Works, Washington, RI. Sponsors: W E Aldrich, R B Allen. (RI).

Leon P Urdang—Controller & purchasing agent, Advance Piece Dye Works Inc, Rutherford, NJ. Sponsors: C F Szely, A A Caddell. (Met).

George I Walker—Plant chemist, Burlington Mills (Australia Ltd), Sydney, Australia. Sponsors: J A Hopwood. R H Griesser.

Richard F Wirth—Lab tech, dyer, Carbic Color & Chem Co, Charlotte, NC. Sponsors: C W Kuhl III, E H Grayson. (Pied).

ASSOCIATE

Arthur E Menke—Product planning & market development, Deering Milliken & Co, Inc, New York, NY. (Met).

JUNIOR

Stanley B Berman—Training program, Tech Lab, E I duPont de Nemours & Co, Inc, Wilmington, Del. Sponsors: A E Bride, H Berman. (Met).

Artimus R Brinson—Textile dyeing & finishing tech, United Piece Dye Works, North Charleston, SC. Sponsors: R J DeWitte, M Goldenberg. (Pied).

Donald W Denman—Lab tech, Eastman Chemical Products, Inc, Lodi, NJ. Sponsors: R E Miller, H E Engel. (Met).

Ivan H Gordon—Product & research engineer, Ladd Knitting Mills, Reading, Pa. Sponsors: T Smoyer, R E Nickerson. (DV).

U Hla Kyi—Textile chemist, Government Spinning and Weaving Factory. Sponsors: G F Walz, R W Sumner.

Arvind K Mody—Textile chemist, New Era Textiles, Bombay, India. Sponsors: G J Gradel, W H Hughes.

STUDENT

Barry L Hooks, Joseph L Hutchison, and **Oscar L Scarbrough Jr**—Students, Alabama Polytechnic Inst, Auburn, Ala. Sponsor: J H Cox. (API).

Leonard G Alves, Cornelius Cahill, Alfred J Furtado, Florence B Habib, and **Alfred I McNally Jr**—Students, Bradford Durfee College of Technology, Fall River, Mass. Sponsor: J Watters.

Russell S Kingsmore — Student, Clemson College, Clemson SC. Sponsor: J Lindsay. (C).

Sidney L Barkoff, Lawrence J Canavan, Albert A Duggan, Eric M Golden, William E Graham, Kenneth M Harms, Harold M Hersh, Adeline L Hwang, Dayne S Johnson, Thomas H Kiernan, John J Klocko, James I C Lang, James H Lewis, Ronald R Luongo, Michael J Matheke, John J Mitnitsky, Vinodchandra K Mody, Sayer B Needelman, Elizabeth Ong, Chandulal C Parikh, Bernadette V Petrauskas, Leonard Rudolph, Arthur R Slomine, Prisco L Villa, and **Chester J Zukowski**—Students. Philadelphia Textile Inst, Philadelphia, Pa. Sponsor: W H Hughes.

TRANSFER TO SENIOR

Everett H Hinton—Chemist, E I duPont de Nemours & Co, Inc, Wilmington, Del. Sponsors: J A Brooks, F Shulze. (DV).

Martin Kallman—Textile chemist, Philadelphia Branch Lab, Ciba Co, Inc, New York, NY. Sponsors: N C Simcoe, R T McGuire. (Met).

Dev R Sharma—Chemist, Gwalior Silk Mills, Gwalior, India. Sponsors: K S Campbell, H A Rutherford.

Edwin C Sherburne—Chemist, Atlas Powder Co, Wilmington, Del. Sponsors: B N Baer, R A Olney. (DV).

Raymond W Tabloski—Chemist, Derby Co, Inc, Lawrence, Mass. Sponsors: E M Lynch Jr, L C Gagnon. (NNE).

Marvin E Taylor—Chemist, Chemstrand Corp, Decatur, Ala. Sponsors: T H Guion, W C Carter.

NOTICE TO AUTHORS OF PAPERS

MANUSCRIPTS for the *Proceedings* and for other publications of the American Association of Textile Chemists and Colorists shall conform to the requirements and standards given in this *Notice*. Before publication, manuscripts for the *Proceedings* shall be approved by the Editor, not only for editorial correctness according to the standards of this *Notice*, but also for content of technical matter. In his work, the Editor may enlist the aid of anonymous reviewers who are selected for expert knowledge in particular fields.

It is presumed that authors in studying the comments of reviewers and of the Editor will remember that all recommendations are made in a kindly, helpful, sympathetic manner to improve the paper in both literary and technical excellence. Although authors should cheerfully consider suggestions, they are expected to defend their position if justified, especially when strictly technical matters are involved with which the authors have an intimate knowledge.

AATCC strives to maintain a high scientific and professional standard for papers. Authors must make every effort to avoid the use of trade names, commercial products or process names wherever such use may be construed as advertising. Wherever possible, scientific nomenclature must be employed. For example, Part I designations in the new *Colour Index* should be used in place of dyestuff trade names. It is recognized that in some instances trade names are necessary to avoid lengthy description. Certain trade names have been so widely used as to become generic and these normally are permissible. Further, some technical papers may involve the presentation of a new product or process wherein trade name reference is obligatory.

Giving due consideration to such valid exceptions, it is incumbent upon the author to maintain the proper scientific attitude, avoiding any expressions or devices aimed at promoting a particular product or process.

Questionable papers are to be referred to the chairman of the Publications Committee, who will submit them to an editorial board which would be appointed as needed. The Board would report to the Publications Committee, which would have the final voice in accepting or rejecting a paper.

MANUSCRIPTS — Manuscripts shall be typewritten double-spaced with approximately one-inch margins on 8.5x11-inch white paper. In addition to the *original*, at least one carbon copy is required. Pages are to be numbered consecutively with Arabic numerals, and each page after the first shall carry the authorship at the very top. Tables and figures shall also be numbered consecutively, the tables with headings containing Roman numerals as TABLE I, TABLE II, etc, and the figures with Arabic numerals as Figure 1, Figure 2, etc, appearing *below* the figures. The names of the authors and their laboratories or business connections should appear below the title of the paper.

LITERARY STYLE AND FORM OF PRESENTATION—In the writing of papers, authors are requested to observe a trenchant, simple style of writing directed to textile chemists and colorists with at least an elementary knowledge of chemistry, physics, mathematics, engineering, textile processes and textile machinery.

In the organization of the material, there should be one or more introductory paragraphs setting forth the occasion, significance and main objectives of the paper and of the method of attack. This should be followed by the body of the presentation, either with discussions interspersed throughout this portion or with a collected section marked "DISCUSSION" after the main body of the paper. Finally, there may be a brief section at the end entitled "SUMMARY" or "CONCLUSIONS."

Center and side headings make for easier reading. Center headings should be employed sparingly and generally will include only very important section headings, such as "INTRODUCTION." "EXPERIMENTAL," "DISCUSSION," "CONCLUSIONS." "SUMMARY," and "REFERENCES." Side headings (see sixth paragraph of this *Notice* for an example) shall be indented and run into the text to which they apply, and shall be separated from the paragraph by a dash. The publisher will print center headings in bold-face capitals and side headings in capitals.

LITERATURE REFERENCES AND FOOTNOTES—References to the literature and all footnotes (except those in tables) shall be numbered consecutively with underlined Arabic numerals in parentheses at the proper place in the text. Where a reference or footnote is to be used again, the original number is simply repeated; this obviates the necessity of repeating the footnote or reference at the bottom of the page. Reference to the literature shall conform to the universal usages followed by *Chemical Abstracts*, which include underlining of journal names to indicate italicization in printing. The abbreviated codes for many journal names appear on page 143 of the 1956 *Year Book*.

The spelling and rules of punctuation followed in manuscripts shall be those found in the "Merriam-Webster New International Dictionary"; abbreviations and chemical formulas shall conform to *Chemical Abstracts*.

FIGURE AND GRAPHS—Figures and graphs should be black line drawings on white drawing paper. Photographic prints are acceptable, preferably glossy prints on double-weight paper. Duplicates should be available for dispatch to reviewers. In graphs, the frame and actual curves should be inked more heavily than the co-ordinate lines, and these latter should not be too close together. Various styles of broken lines are sometimes desirable to distinguish curves. Experimental points should be given with small plane figures, such as circles, squares, diamonds or triangles. Numbers and legends on co-ordinate axes are to be lettered in the graph by the author. Numbers and titles of figures should be placed below the diagram or on the edge of the back. Each piece of illustration copy should bear on the margin or on the edge of the back the name of the author and the title of the paper.

SYNOPSIS—A separately written synopsis of not over 200 words containing the gist of the subject matter must accompany every manuscript.

REPRINTS — Fifty overrun copies of papers published in the *Proceedings* will be furnished without charge by the publisher if requested when galley proofs are returned. These are printed on one side of the sheet only and then stapled together. A schedule of prices of reprints in the usual form accompanies the galley proofs, which will be sent to the author before publication.

OWNERSHIP OF COPYRIGHTS AND PATENTS—All papers presented at general meetings of the Association or at meetings of any of its local sections and all communications shall become the property of the Association. Such papers are not to be published elsewhere until they have appeared in the *Proceedings* of the Association. Papers published in the *Proceedings* are copyrighted by the Association. Any patentable disclosures shall of course remain the property of the author or authors.

TRADEMARKS—As the AATCC wishes to co-operate in the protection of trademarks, it is requested that, in the body of the article, trademarks be written with an initial capital letter.

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NOVEMBER NOTE
1958

Inter Alia — Inter Nos

P J WOOD

MULTUM IN PARVO

Recently we had occasion to refer to the matter of the use of simple expressions in the matter of scientific reports and papers.

Since then we received a booklet titled "Report Writing" and it cost us what the English colloquially call two bob, the cryptic sign for which is 2/-. In our money it represents the munificent sum of 28 cents. Never in our experience do we remember having received more value for as little money.

The first page is given to the title, which is usual. From this page we note that this is a companion volume, "Tips on Talking" for which we have made a memorandum to send at the first opportunity. The second page contains the table of contents, from which we see that the subject proper is covered in pages 3 to 13 totalling 11 pages. This is followed by 6 appendices or appendixes (Webster gives both plurals), which looks like a lot of appendixes, but after reading them we are not inclined to recommend appendectomy for any one of them, seven pages of these.

This publication is the joint effort of several distinguished organizations: The British Association for Commercial and Industrial Education, an activity sponsored, as Patron, by none other than His Royal Highness, The Duke of Edinburgh; the Midland Group for Presentation of Technical Information; the Midland Training within Industry Association and a section of the Guild of Students of the College of Technology, Birmingham, known as the Industrial Administration Group.

The old adage about "too many cooks spoil the broth" is inapplicable here; the job has been done very well indeed.

In justice to this literary gem we should have headed this item, MULTISSIMUM IN PARVISSIMO. Maybe MAXIMUM IN MINIMO would be even better.

IT ISN'T THE HUMIDITY

The sweltering days are gone, the hottest of the year. What, if anything, are we going to do about it to make things more comfortable next year? As in the mitigation of other ills, textiles come to the rescue.

One of the answers is the installation of awnings, that is, if you like awnings. There is much to be said for awnings, and not too much against them.

Today, it is not too uncommon to see awnings made of many varieties of materials, the old original being canvas or light duck. Having made our living out of textiles, practically from a child up, it is understandable that we should be more than slightly prejudiced in favor of the textile fabric as the raw material for making awnings.

Other materials that we have seen used for this purpose are principally light sheet metals and plastics. The chief disadvantage of these two materials is that awnings made from them cannot be rolled up at times when the awning is not needed to screen out the torrid rays of the sun, in the evening, and on cloudy days. After observing our neighbors' awnings for the last year or two, we note that these shades remain in situ all day and all night, all summer, likewise all winter.

Cotton awnings, on the other hand, can be rolled up on those sides of the house not exposed to the hot rays, allowing adequate illumination of the rooms as well as ingress of the beneficial ultra violet rays, or that portion of this section of the spectrum which can make its way through ordinary window glass. Moreover, these cotton awnings can be taken down for the winter, when the entry of the sun's warm rays through windows can provide heat at no expense, thus cutting down the coal, oil or gas bill.

Thanks to researches made by the American Society of Heating and Air-Conditioning Engineers. it is now possible to estimate just how much heat any given type of awning will exclude from a room. They have found that canvas awnings can exclude from 55 to 77% of the solar heat; that light-colored awnings are more effective than dark; that awnings with sides are more efficient than those without sides; that opaque awnings are more satisfactory than those constructed of woven plastic fabrics, because the loose weave permits passage of significant amounts of sunlight.

This is a hot subject. Let's talk about something else.

TRIENNIAL "WHAT'S WHAT"

A little less than twelve years ago, John A McCutcheon, the well-known consultant on detergents, both ancient and modern, compiled his first listing of American synthetic detergents and emulsifiers.

Recently John sent us a copy of the present issue, which starts, as all previous ones have done, with a review noting any basic changes that have taken place since publication of the previous list. He points out the growth of the lignin derivatives, production of which has more than doubled since 1954, and notes the rapid increase in the use of solubilizers and detergent bead conditioners, such as xylene sulfonate and its toluene analogue.

The next section is devoted to a "thumbnail" description of over 2000 surfactants, mostly one-line histories. The information given is usually enough to identify any American product of this type, in general terms, and it is possible to class most products with their competing prototypes.

Names and addresses of the manufacturers of this enormous number of surface-active agents, numbering almost 300 concerns, complete this very useful piece of technical literature.

COTTON FINISHING CONFERENCE

While this conference has been fully reported elsewhere, we feel impelled to make a passing reference to this august function, to remind ourselves of some people who were there and to comment on at least one or two matters that have not been mentioned in other places or have not been emphasized.

What a serious collection of serious thinkers attached firmly or loosely with the textile and textile chemical industry we met there! First alphabetically we might mention Carl Brubaker whose comment, "the best of these conventions I have ever attended" is surely worth remarking, as this would undoubtedly express the opinion of most of those attending.

Another memo we might read off from our notes is the statement of Lawrence Marx regarding the importance of the colloquium as indicated by the fact that, of the 6.7 billion yards of cotton goods produced last year in this country, 1.1 billion yards were finished with some form or other of "wash & wear" treatment. He made the astounding statement that this figure might very likely be doubled in the present year.

Consultants and research chemists from chemical companies were there in numbers, but the attendance of the actual dyehouse and mill chemists was somewhat surprising, as these are the men whose work will most profit from the work of such a conference.

Harold Stiegler was there at every session. His organization, AATCC, has done more than any other association to clarify the methods of testing the fabrics treated by these new chemical finishes.

Among outstanding private consultants we noted the presence of Jay Goldberg, who, incidentally, has a splendid article in the September number of the Canadian Textile Journal. This article bears the title of "Future Goals in the Field of Dyeing and Finishing".

We saw Hobart Souther, but only in the distance, as we did many other luminaries of the textile coloring fraternity.

Osborn C Bacon of DuPont greeted us kindly. On the list of "Cooks" attending were Alton A of Arkansas Co, Louis B of Millville Manufacturing Co and T F, the well-known Cyanamidian. Alton A was the only one we actually saw.

Bernard Easton, candidate for the office of vice president of AATCC, seriously surveyed the proceedings, as did Sidney Edelstein, our No. 1 Archivist in AATCC.

Fred Fortess acted as a very efficient catalyst to spur the speakers to further effort in explaining abstruse points in their several discourses. Fred's own explanations of some of these points were right enlightening.

We could go on for a couple of pages with further comments on theories propounded and personalities encountered but space has limitations.—QEF

. PATENT DIGEST .

PAUL WENGRAF

EMULSION FOR PIGMENT PRINTING———Protective Colloids Reacted with Polyfunctional Compounds D,2,07

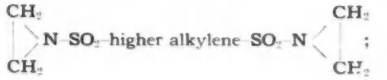
U S Pat 2,813,083 (Craemer——Nov 12, 1957)

A pigmented lacquer-in-water emulsion, described in this specification as useful for printing, impregnating and coating, is comprised of the following components: A) a water-insoluble polymer, and B) a water-soluble protective colloid containing reactive groups to form the outer (aqueous) phase; C) a polyfunctional compound which reacts (optionally at elevated temperatures) with "B" and carries the pigment, and D) a water-insoluble solvent with a boiling point above 75°C to form the inner (dispersed) phase of the printed composition.

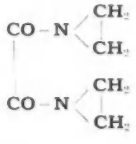
For "A", all water-insoluble polymers which yield flexible films are suitable.

For "B", a large number of protective colloids, such as casein, tragacanth, or water-soluble alginates, may be used.

For "C", the polyfunctional compounds which are to react with "B", serve as cross-linking agents, and finally impart water insolubility to the composition, should contain at least two *ethylene imine groups* (alkylene polyethylene imines): eg, adducts of ethylene imine, such as



or they may belong to a group of polyisocyanates, such as



Example (for a printing paste): A 40% aqueous dispersion of a copolymer of acrylic acid ethyl ester, styrene and vinyl isobutyl ether (A) is mixed with a six percent solution of tragacanth in ammoniacal water (B) plus a condensate of octadecylalcohol with ethylene oxide (as emulsifier). A mixture of lacquer benzine and trichloroethylene (D) is stirred in until a flexible binding paste results. Then a blend of a finely dispersed aqueous pigment paste and the reaction product of ethylene imine with oxalic acid diethylester (C)——see formula above——is dispersed and homogenized with the binding paste. This composition is printed on a polyamide fabric and fixed by heating for five to 10 minutes at 100 to 300°C. A sharp print, fast to rubbing and washing, reportedly results.

Among the references cited by the Patent Office:

U S Pat 2,374,602 (Am Cyanamid/-1945) describes a pigment printing emulsion of the water-in-oil type with the solvent-soluble resin in the continuous phase.

U S Pat 2,558,053 (Interchemical Corp/1951) describes a water-in-lacquer printing emulsion comprised of a lacquer phase containing a pigmented dispersion of solid polyethylene in a solvent solution of a thermosetting resin.

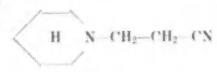
U S Pat 2,643,958 (Farbenfabr Bayer/1953) discusses a pigment-printing method, which avoids organic solvents. Fixing agents are the reaction products of an aliphatic diamine with an acrylic acid ester plus a cross-linking agent such as an acryl-substituted triazine [cf *Am Dyestuff Reptr 43, 17* (1954)].

GAS-FADING INHIBITORS ———Cyanoalkylated Amines of Heterocyclic N-Compounds G, 1

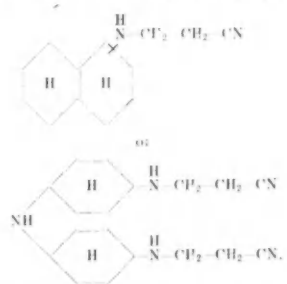
U S Pat 2,813,773 (Bad Anilin— & Sodafabrik Eisele et al——Nov 19, 1957)

The preamble to this patent postulates that an efficient acid-fading inhibitor should be colorless, adapted to longer exposure to combustion gases, fast to drycleaning and washing, and nontoxic. Known products reportedly satisfy some but not all these requirements. In contrast certain cyanoalkylamines linked to mononitrogenous heterocyclic compounds and amines substituted by cycloaliphatic radicles and cyanoalkyl groups (as protected by the current patent) were found to be appropriate for the above purpose in every respect. These compounds are generally obtained by reacting amines or imines with aldehydes plus hydrocyanic acid or with unsaturated aliphatic nitriles, such as acrylo- or methacrylonitrile.

Ethylene imine, pyrrholidine, hexamethylenetetramine, piperazine, diamino dicyclohexylmethane and many others are suitable N-containing compounds which are linked to the cyanoalkyl group. The final products, therefore, are characterized by either a heterocyclic N-containing compound in which the cyanoalkyl residue is attached to N; eg,



or by an isocyclic amino compound carrying cyanoalkyls linked to one or more of the amino N-atoms, eg,



By reason of their high affinity to cellulose derivatives (ester of cellulose, etc) the above compounds, solubilized by a formaldehyde-bisulfite treatment, may be applied simultaneous with the dyeing process. Upon being heated, the products decompose in the dyebath slowly, leaving the insoluble inhibitor on the fiber.

The specification presents formulas of 75 different compounds which fulfill these conditions, among them the products mentioned above.

References cited by the Patent Office:

U S Pat 2,017,119 (Celanese Corp of Am/1935) improving the colorfastness of dyes on cellulose acetate by incorporating a colorless substance containing a basic amino group directly linked to an alkyl- or aralkyl group (dibenzylamine).

U S Pat 2,529,935 (General Aniline & Film/1951) advocates the use of 1-4-diphenyl piperazine as a gas-fading inhibitor.

U S Pat 2,539,212 (General Aniline & Film/1951) prevention of gas fading by applying diaryl-substituted polyalkylene polyamines.

GAS-FADING INHIBITORS

———Esters of Hydroxyalkylamines G,1

U S Pat 2,813,774 (Bad Anilin— & Sodafabrik ——Schuster et al——Nov 19, 1957)

In contrast to those mentioned in U S Pat 2,813,733, the gas-fading inhibitors protected by this patent are composed of colorless esters of hydroxyalkylamines, such as esters of beta diethylamine propanol, beta diethylamine ethanol, N-alkyl-di(hydroxyethyl) amines, etc. Ester-forming acids, such as the aromatic, aliphatic, or cycloaliphatic carboxylic acids (eg, benzoic, cyclohexyl carboxylic, or acetic acids), are applied before, after, or during the dyeing from dispersions or, optionally, in the form of their water-soluble reaction products with formaldehyde-bisulfite, analogous to the procedure described in U S Pat 2,813,773.

Example: Acetate of cellulose is dyed for 45 min at 75-80° C with 1-4-diamino anthraquinone in presence of an emulsion of the compound C_4H_9-$N(CH_2 - CH_2 - CH_2 - OOC - C_6H_5)_2$, ie, bis benzoic acid ester of N-butyl diethanolamine. A violet dyeing of good fastness to waste gas resulted.

Among the references cited by the Patent Office:

U S Pat 2,094,809 (Celanese Corp of Am/1937) acylamino-substituted aralkyldialkyl amines, eg, p-acetylamino-benzyl-diethyl amine, are described as antifading agents.

U S Pat 2,706,142 (Gen Aniline & Film/1955): dyeings on cellulose acetate are rendered resistant to gas fading by a treatment with an emulsion of a tertiary amine, containing one phenoxy ethoxy alkyl group, such as p-tetramethylbutyl-phenoxy ethoxy ethyldimethylamine [cf *Am Dyestuff Reptr* 45, 404 (1956)].

ANTISTATIC TREATMENT OF SYNTHETIC FIBERS———

Applying Pentahalo Benzene Sulfonates G,1

U S Pat 2,815,301 (Dow Chemical Co——Murdock——Dec 3, 1957)

This invention is designed to provide washfast antistatic effects, especially on acrylic fibers. The antistatic treatment calls for application of a pentahalo- (ie, penta chloro- or penta bromo-) benzene sulfonate. Although this agent may be used advantageously *during the manufacturing stage* in the formation of acrylic or other synthetic fibers, the application on completely processed fibrous material (see example IV) is within the scope of the invention. Penthalo-benzene sulfonic acid itself is said to be water-soluble and substantive to the acrylic fiber in contrast to its different salts (col 3, lines 5-23), so the product may be insolubilized on the fiber by impregnating with the aqueous solution of the acid and aftertreating with mild soap solutions.

Reference cited by the Patent Office:

U S Pat 2,700,001 (Monsanto/1955) describes an antistatic treatment with sulfonated polystyrene solutions, followed by a precipitating aftertreatment with a higher amine or, otherwise, applying colloidal solutions of polyamine salts of sulfonated polystyrene.

CARPET DECORATING DEVICE

———Color Soaked up on Defined Areas D,4

U S Pat 2,816,811 (Deep Dye Industries——G and M Tillett——Dec 17, 1957)

The preamble to this patent states that pile fabrics decorated with multicolored designs do not show strictly preserved boundaries between the single colors nor sufficient penetration of the pile yarns by the dyes. The object of simultaneously producing sharp outlines and penetration into the pile as deeply as may be desired reportedly has been attained by soaking up the dye solution in defined areas instead of forcing the dye solution into the material.

As shown in Figure 1, receptacles 10, 11, and 12, defined by freely standing thin walls (14), are provided. The dyestuff solutions flow from reservoirs through channels (15) into the receptacles. A pile fabric (17) is placed with the piles (16) downwards—see Figure 2—above the receptacles and pressed down by a rigid sheet (20) applied to the fabric, so that the piles are immersed for the necessary time in the dyeing liquid, forming distinct colored areas of deep penetration.

Among the references cited by the Patent Office:

U S Pat 1,977,338 (Eclipse Textile Devices/1934) covers a method by which masses of textile materials may be spot dyed by clamping parts of the material to prevent local dye penetration and immersing the remaining parts in the dyebath.

U S Pat 2,247,346 (Blair/1941) multicolored yarns are dyed in a device consisting of an annular body with radial partitions, containing dye solutions of different shade while the skein is forced into the single compartments.

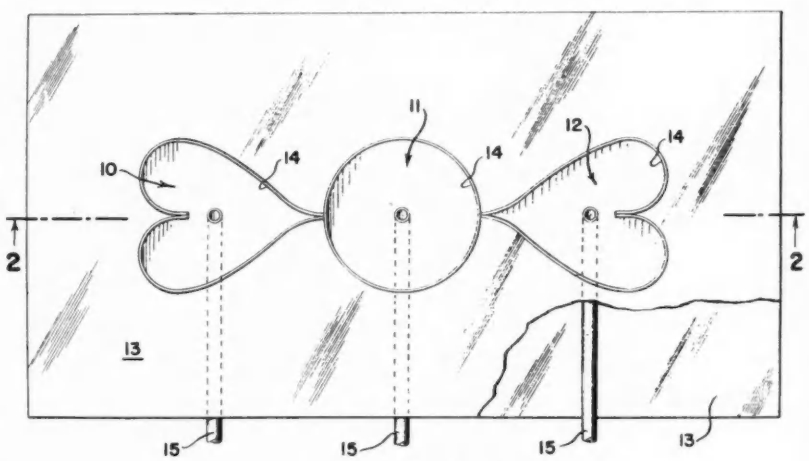


Figure 1—USP 2,816,811

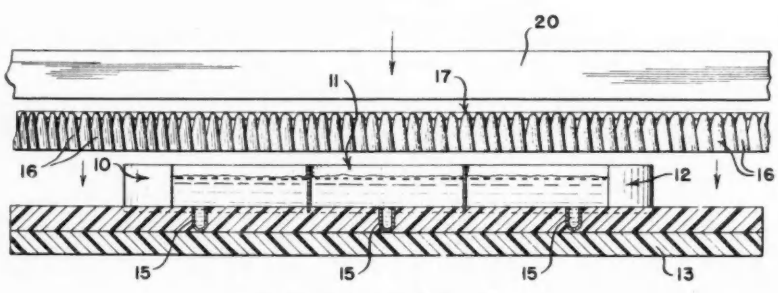
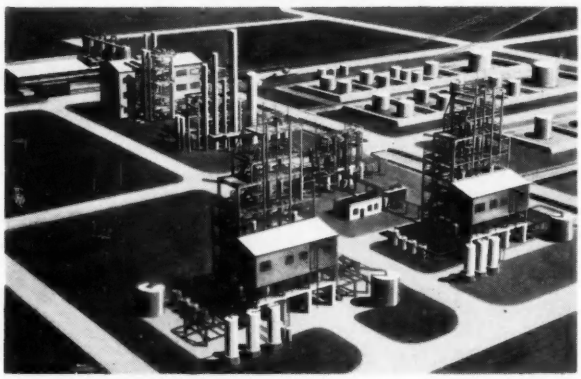


Figure 2—USP 2,816,811

News of the Trade



Artists' conception of Air Production Co's PVA resin plant at Calvert City, Ky

Air Reduction Starts Construction of PVA Resin Plant

The Air Reduction Chemical Co has started construction of a new polyvinyl alcohol resin plant at Calvert City, Ky, and a supporting pilot plant at Bound Brook, NJ. Both projects reportedly will cost over $12,000,000 and are expected to be on stream by early 1960.

The 20-million pound per year polyvinyl alcohol resin plant is being built by the Lummus Company of New York.

Textile sizing and finishes, and emulsifying and thickening agents are among the applications for polyvinyl alcohol in this country.

The manufacturing process to be used by Airco was obtained under license from the Kurashiki Rayon Company, Ltd, of Osaka, Japan, where the major use for the resin is in the production of a synthetic fiber known as vinylon. Kurashiki is the leading producer of vinylon in Japan.

Rights to Kurashiki's vinylon fiber process also have been granted to Air Reduction in the United States. Facilities for fiber production are still in the planning stages.

Goodyear Establishes Vitel Products Development Dept

Establishment of a Vitel Products Development department to handle problems of application and sales service for Vitel resins and Videne laminating film has been announced by The Goodyear Tire & Rubber Company.

Vitel, introduced earlier this year by Goodyear, is a polyester resin from which synthetic textile fibers can be spun. Videne, made from a member of this same polyester family, reportedly can be adhered under heat and pressure without adhesives to a wide variety of end products to give highly protective and decorative surfaces.

Named as manager of the new department was C W Taylor, former process engineer in the Goodyear research division, who played an important role in the development of the new Goodyear polyester material. In his new post, Taylor will be responsible to M E Wendt, development manager for chemical materials and products.

ASME Conference to Cover Finishing Aspects

The textile engineering division of the American Society of Mechanical Engineers (ASME) has completed general program plans for a March 12-13 conference on "Trends in Textile Engineering." The annual Southern spring meeting, to be held at the Clemson House, will feature papers and discussions on "Various Aspects of the Finishing Process," as well as "The Shuttleless Loom," and "Unifil."

J C Cook Jr, head of the mechanical engineering department at Clemson College has been elected to the chairmanship of the conference. S M Watson, professor of mechanical engineering at Clemson, was chosen to head the conference arrangements committee, and John McPherson Jr, vice-president, McPherson Company, Greenville, chairman of the conference program committee. Chairmen will appoint their own committees, and conference speakers will be selected by the program committee and announced later.

An evening banquet will be held March 12, in the Clemson House, highlighting the social agenda.

Dow Shipping Chlorine, Caustic from New La Facilities

First commercial shipments of liquid chlorine and 50% and 73% caustic soda were made October 1 from The Dow Chemical Company's new facilities at its Louisiana Division at Plaquemine, on the Mississippi River. The plants operate as part of Dow's new chemical complex 10 miles south of Baton Rouge.

Dow also produces chlorine and caustic soda at its Midland (Mich) Division; Texas Division, Freeport; Western Division, Pittsburg, Calif; and at its Canadian subsidiary operation, Dow Chemical of Canada, Limited, Sarnia, Ontario.

Textile Research & Development Corp Formed

A new firm specializing in wash-and-wear evaluation of fabrics and garments and research and product development for chemical manufacturers has been set up near Asheville, NC, by George Fine with a capital stock of $100,000.

Mr Fine is president and director of three service divisions of the Corporation—American Wash and Wear, National Garment Finishing and Laundry Research Institutes. He is contacting some 1000 manufacturers and converters to acquaint them with his testing and service plans.

Fine said his processes being developed will minimize seam pucker of wash-and-wear garments, will improve press and shape retention of these garments, will reduce edge-wear abrasions of wash and wear materials, and will obtain 90 to 100 wash-and-wear fabric ratings.

His wash and wear effectiveness in terms of percentage ratings follow: 100, no ironing required; 90, little or no ironing required; 80, touch-up ironing required; and 70, ironing required. These ratings will be attached to sample fabrics sent the laboratories for testing. A photograph rating method will be used to show rating results and pictures will be attached to forms along with fabric samples sent for testing purposes.

He said his company plans to establish quality control laboratories and testing procedures, with particular emphasis on wash-and-wear fabrics and garments. His corporation's activities will include research and development of wash-and-wear products.

Beattie Carpet Experimenting in Bulk Handling of Chemicals

Bulk material handling, which already has found its way into most industries, has entered the carpet and rug industry, not for the handling of skein yarn or raw wool, but in the handling of the chemicals utilized in the dyeing of these materials, and in the chemicals utilized in other processes in rug manufacture.

At Beattie Carpet and Rug Co, Little Falls, NJ, manufacturers of rugs and carpets from raw wool, this new (for the industry) experiment in bulk handling is taking place. Beattie has been utilizing the Tote System of handling, developed and engineered by Tote System, Inc, of Beatrice, Neb, for the storage of sodium sulfite and sodium chloride for more than a year.

Tote Bins, heart of the system, carry about 6,000 lbs each of the chemicals. They are 74-cubic-foot capacity, hermetically sealed aluminum containers. At Beattie, they are being used for small-batch introduction of materials into processing, and the storage of these materials in bulk.

Normally, the Tote System is used only for large operations, where tons of material are used daily. This consideration usually is the one that prompts the decision whether or not a company should use such bulk containers. In using them for small batches, Beattie is said to be proving the versatility of large containers for small-quantity operations.

The reported benefits Beattie derives from the system are many:

First, before the bins were installed, a number of 100-pound bags of material were dumped on plywood and scooped up as needed, but this created a twofold problem: a) housekeeping chores in such an operation were extensive; and b) the hygroscopic nature of both chemicals created a severe problem in such humid atmosphere as was encountered in the dyeing rooms. The loss through moisture pickup was extensive. Both these problems are said to have been eliminated by the Tote System.

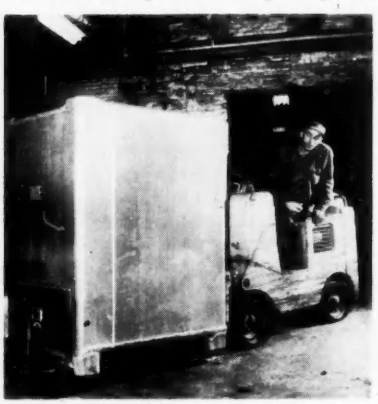
Second, the storage of many bags presented a problem. Sixty palleted bags take up considerably more room than does one untiered bin.

Third, outside storage was impossible with bagged materials. Now, the hermetically sealed unit containers allow for internal or external storage. The bins can be handled on fork lift trucks or fork lifts and can be left outside in rain or cold weather, thus allowing more inside warehouse area for other material.

Fourth, the danger of bags breaking and loss through spillage and contamination was always inherent in the previous system. Now, this problem has been eliminated by the bins.

To achieve these benefits, Beattie found it necessary to purchase only five of the units, as it uses 3,000 pounds of sodium sulfite and 1,500 pounds of sodium chloride weekly.

Single bin in dyeing room. Operator scoops out desired amount of sodium chloride for dyeing operations.



Fork truck operator brings full bin to storage area.

Fork lift operator removes empty bin from dyeing room after replacing it with full bin containing 5,000 lbs of material.

Hosing down floor in Beattie's dye room could wreak havoc with hygroscopic materials, but in bins they are safe from the water. This created problem when Beattie received sodium chloride and sulfite in bags and dumped them on plywood. Housekeeping was difficult operation.

Closeup of area where bin contents are removed. Bins at Beattie were specially adapted for this handling.

May We Put Some in Your Hands?

The Century Brand Oleic Acids pictured have the following properties:

	Century 1050 L P White Oleic Acid	Century 1010 Distilled Oleic Acid
Maximum color, Lovibond	5Y/0.5R—5¼"	15Y/3R—1"
Acid value	197—203	195—201
Saponification value	198—205	197—203
Unsaponifiable content	1.5% max.	2.0% max.
Polyunsaturates	3% max.	

We would like you to see our Oleic Acids and compare them critically with other competitive products, so you may fully appreciate Century Brand quality. We invite your comparison of Century Brand Oleic Acids because only you can realize their advantages in *your* products.

A request to Dept. H-44 for samples will receive prompt attention and we will welcome the opportunity to put these better products in your hands.

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PRECISION: ±0.2 G
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The unit has a built-in taring device to a total of 500 grams. With it empty containers for dyestuffs or yarn can be tared to read zero on the balance.

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Laurel HYDROCOP and 3B SOFTENER
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. . . give a softer, better cone which reduces the number of pulls and sloughs off the cones.
. . . condition the yarn which results in a stronger yarn with less breaks.
. . . provide equally satisfactory results on natural, bleached or dyed yarns.
. . . cause no odor or color changes, and need not be scoured out of the goods.
. . . provide excellent results on all natural, synthetic and blended spun yarns (particularly cotton, wool, worsted, Cashmere and Orlon).
. . . are readily removed from the cloth in a regular scour or boil-off and will not interfere with any subsequent dyeing, bleaching or finishing process.
. . . are easily prepared for use and form stable emulsions which are applied to the yarn from emulsion troughs or any standard coning or winding machine.

Why not put these advantages to work for YOU? Write us today for generous samples and detailed working instructions. Our experienced representatives are also available to discuss your specific problems. Write TODAY while you think of it.

Should you prefer a *blend* of these two Laurel quality products, we recommend Laurel Softener 3BH. Sample on request.

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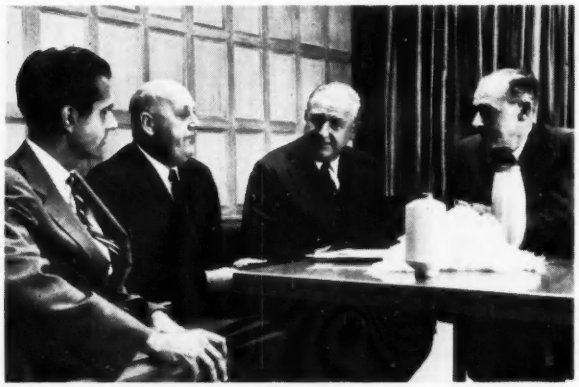

Celanese Corporation of America and Imperial Chemical Industries Limited of Great Britain recently announced formation of a jointly owned subsidiary to produce a polyester fiber, trademarked Teron, in the United States. Shown here, with staple and filament yarns of the ICI polyester fiber, Terylene, are: John W Brooks, Celanese vice president and general manager of the company's Textile Division; Harold Blancke, president of Celanese; Peter Christopher Allen, a director of ICI, and E D Kamm, a director of the Fibres Division of ICI.

National Adhesives to Build Vinyl Acetate Polymer Plant at Toronto

National Adhesives (Canada) Ltd has begun construction of a vinyl emulsion polymerization plant to be located on the company's premises, 371 Wallace Avenue, Toronto. National Adhesives is a subsidiary of National Starch Products Inc, New York. Facilities of the new plant will provide initially for 5,000,000 pounds vinyl emulsion capacity annually, and will be expandable to 8,000,000 pounds at a future date. The plant is scheduled to go on stream by March 1, 1959.

'59 Cotton Week Dates Set

Official dates for 1959 National Cotton Week have been set for May 18 to May 23.

It will be the 29th annual celebration of Cotton Week, which pays tribute to the nation's no. 1 fiber, accounting for 65 percent of all textiles made in America.

"It's Cotton Time, USA," theme of the 1958 event, will be repeated on 1959 Cotton Week posters.

Cotton Week is sponsored by the National Cotton Council.

Wallerstein Acquires British Affiliate

Wallerstein Company, Inc, New York, manufacturer of enzymatic products, has acquired a British affiliate, Wheeler & Huisking, Ltd, 26 Great Tower Street, London. The British concern is a consolidation of Henry Wheeler, Ltd, established in 1897, and Charles L Huisking & Co, Ltd, founded in 1919. The company is engaged in the importation of crude oils, drugs, spices, essential oils and chemicals. In this capacity it has acted as agents for the Wallerstein Company for a number of years.

CCNE Holds Fall Outing

Approximately 85 members and guests participated in the Fall Outing of the Chemical Club of New England, Inc, which was held September 18-20 on Cape Cod at Chatham Bars Inn, Chatham, Mass.

Irving G Loxley, Hayden Newport Chemical Corp, CCNE president, was host at a cocktail party and dinner on the 19th.

Activities included golf, shuffleboard, swimming, and deep-sea fishing.

Armour Chemical Announces Price Reductions

Price reductions of 3 to 14 cents a pound have been announced by the Chemical Division of Armour and Company on its line of ethoxylated fatty acids and fatty acid derivatives.

The reductions were made possible by recently completed enlarged production facilities at the Armour chemical plant at McCook, Ill.

The products include ethoxylated amines, diamines, amides, and fatty acids. They are cationic and nonionic surface-active agents which are used as textile softener emulsifiers, wetting agents, dispersants, stabilizers and solubilizing agents.

PTI Freshman Registration at Peak

One hundred and fifteen freshman, the highest since 1951, are registered at the Philadelphia Textile Institute during this, its 75th Diamond Jubilee fall semester. Two hundred and sixty upper classmen are enrolled.

Of the freshman class, eighty are American students and thirty five are from twelve foreign countries. The freshman class shows forty-five registrants for the Textile Engineering degree course; thirty-five, Management and Marketing; twenty, Chemistry; and fifteen, Design.

Two UMM Finishing Plants Licensed to Apply Syl-Mer

The Clearwater (South Carolina) and Old Fort (North Carolina) Finishing Plants of United Merchants & Manufacturers, Inc have been licensed to apply Syl-mer water- and stain-resistant silicone finish to decorative fabrics.

The licensing agreement provides that both plants may use Dow Corning Corp's Syl-mer name and identifying trade name in association with its own finishes, and may supply Syl-mer hang tags to all their manufacturer customers. The program also stresses the maintenance of quality control through laboratory testing of all Syl-mer treated fabrics.

General Calendar

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGY
Jan 7, Feb 4, Mar 4, Apr 1 (Della Robbia Room, Hotel Vanderbilt, New York, NY)

AMERICAN COTTON MANUFACTURERS INSTITUTE
Mar 19-21 (Annual Convention — Palm Beach Biltmore Hotel, Palm Beach, Fla)

AMERICAN OIL CHEMISTS SOCIETY
April 20-22, 1959 (Roosevelt Hotel, New Orleans, La; Sept 28-30, 1959 (Statler Hotel, Los Angeles, Calif)

AMERICAN STANDARDS ASSOCIATION
Nov 18-20 (9th National Conference on Standards, Hotel Roosevelt, New York, NY)

CANADIAN ASSOCIATION OF TEXTILE COLOURISTS AND CHEMISTS (QUEBEC SECTION)
Dec 13 (McGill Univ, Montreal, Que); Jan 30 (joint meeting with Textile Society of Canada Eastern Div, Ritz Carlton Hotel, Montreal); Feb 21, Mar 21, Apr 18 (McGill Univ, Montreal, Que); June 20 (Annual Golf Tournament)

THE FIBER SOCIETY
April 29-30 (Fontana Village, NC)

MANUFACTURING CHEMISTS' ASSOCIATION
Nov 25 (8th Semi-Annual Meeting and Winter Conference, Hotel Statler, New York, NY)

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES
Dec 3, Jan 13, Feb 10, March 11 (Luncheon meetings at the Hotel Roosevelt, New York, NY)

• NAMES IN THE NEWS •

Solvay Process Division, Allied Chemical Corp, has made known the following new appointments:

Arthur Phillips Jr, formerly director of sales, has been named vice president of the Division; **Verne W Aubel Jr,** formerly assistant director of sales, is now director of sales: **Robert L Reynolds,** formerly manager of the Sales Department's Organic Chemicals Section, moves up to assistant director of sales; and **G Richard Barclay,** formerly assistant to the manager of the Organic Chemicals Section, moves up to manager of the Section. All four men will continue to be located at 61 Broadway, New York.

Also located at 61 Broadway are **Frederick H Gilchrest,** newly appointed technical assistant to the director of product development; **Harry C Todd,** recently named to the newly created post of manager of distributor sales; and **William J Cannon,** who succeeds Mr Todd as advertising manager.

Accelerated emphasis on developing new product uses and applications has been underscored by Solvay in assigning personnel to newly created posts in the research department at Syracuse, NY, as follows:

Robert H Reed is appointed director of research; **Herbert C Wholers** becomes assistant director, joining the two present assistants, **Howard A Bewich** and **E Westley Smith;** and **Arlie P Julien** is named chief of application research.

Westvaco Chlor-Alkali Division of Food Machinery and Chemical Corporation has appointed **John M Richard** as New York district sales manager. Other sales department appointments include **John R Jacobucci,** named alkali product manager; **Robert E Cochran,** assistant alkali product manager; and **Charles E Kaneen,** assistant to the sales manager.

In the New York office since 1954, Mr Richard has handled both phosphates and alkalis as product manager.

Prior to his present assignment, Mr Jacobucci was general superintendent of the Company's soda ash mining and production facilities at Green River, Wyo.

Mr Cochran became assistant to the executive vice president of the Chemical Division in 1957, a position he held until his present assignment.

Mr Kaneen moved to the New York office in 1951 in a production capacity, later becoming assistant sales manager for alkali chemicals.

Carl S Smith has been appointed executive assistant to **Bert Cremers,** vice president of Wyandotte Chemicals Corporation and general manager of the company's Michigan Alkali Division.

Smith joined Wyandotte earlier this year as a staff assistant and has been administrator of the controller's division in recent months.

Haley

Sackett

Paris

Endres

Four additions to the Organic Chemical Sales Department staff of Emery Industries have been announced. **Robert S Haley** has been appointed to the New York office; **J Warren Sackett,** the Cleveland office; **Walter R Paris,** the Lowell, Mass, office; and **Robert H Endres** has been assigned to a newly created territory with headquarters in Pittsburgh.

Mr Haley transfers to the Organic Chemical Sales Department from the Vopcolene Division, for which he served as Eastern Sales Representative prior to its acquisition by Emery earlier this year.

Mr Sackett was general manager of Bay Rubber & Plastics, Inc, before joining Emery. He will handle Emery's entire Organic Chemical line in eastern Michigan and the state of Ohio except the southeastern portion.

Mr Paris went to Emery from Godfrey L Cabot, Inc, where he was New England sales representative.

Mr Endres formerly was associated with Standard Oil Co (Indiana). His new territory includes western New York State, western Pennsylvania, West Virginia, and southeastern Ohio.

Procter & Gamble has announced the appointment of **Paul R Parrette** as manager of the company's newly established Trade-Relations Division.

Mr Parrette, who has been associated with Procter & Gamble for 32 years, recently has been president and general manager of P&G's Philippine subsidiary and during the last two years has been setting up the organization of Procter & Gamble Belge, which manufactures and supplies company products to Belgium, Holland and Luxembourg. The major part of his experience with Procter & Gamble, however, has been in the company's sales organization.

Martin H Gurley Jr, has been appointed to the newly created position of new product analyst of the Vulcan Rubber Products Division of Reeves Brothers, Inc.

Mr Gurley, who has assumed his new responsibilities at the company's Buena Vista, Va, plant, will be responsible for research and analytical work in connection with the development of new products and product applications of the Vulcan Rubber Products Division.

Mr Gurley has held several positions as a research executive and consultant in the textile, chemical, paper, plastics, food stuff, and paint industries. Prior to joining Reeves Brothers, Inc, this year he was general manager of the Textile Division of Thermoid Company, Trenton, NJ.

The Atlantic Refining Company has announced the appointment of **William I Ludlow** as chemical sales engineer of the firm's southern marketing region. He will serve the southeastern states from the company's regional headquarters at Charlotte.

Mr Ludlow, who joined Atlantic in 1957, replaces **W E Smith,** who has been transferred to the company's newly established Los Angeles chemicals division sales office. Smith had served as chemicals sales representative in Charlotte since 1953.

George M Seib, formerly secretary of Oakite Products, Inc, has been appointed vice president of the company. **Erwin H Steif,** who was Mr Seib's assistant, has been promoted to the post of secretary.

Eustace Lingle has been named vice president in charge of industrial sales and education.